



Operation, Maintenance, and Monitoring Report (OMM) Plan (Amendment #3)

Dearborn Refining Site
Dearborn, Michigan

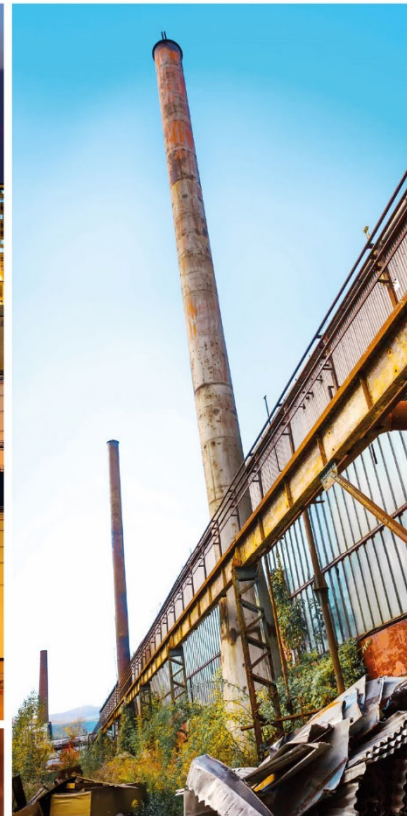


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LIST OF ACRONYMS

Agreement	Administrative Settlement Agreement and Order on Consent
CRA	Conestoga-Rovers & Associates, currently GHD
GHD	GHD Services, Inc.
ft	feet
FML	flexible membrane liner
HASP	Site Health and Safety Plan
HDPE	High Density Polyethylene
LNAPL	light non-aqueous phase liquid
mg/kg	milligram per kilogram
MPE	Multi-Phase Extraction
OMM	Operation, Maintenance and Monitoring
OMM Plan	Operation, Maintenance and Monitoring Plan
PCB	polychlorinated biphenyls
PVT	passive ventilation trench
RA	Response Action
Site	Dearborn Refining site located at 3901 Wyoming Avenue in the City of Dearborn, Wayne County, Michigan
sy	square yards
U.S. EPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
Work Plan	Removal Action Work Plan
wc	water column

1.0 INTRODUCTION

1.1 GENERAL

GHD Services, Inc. (GHD) has prepared this Operation, Maintenance, and Monitoring Plan (OMM Plan) (Amendment #3) for the Dearborn Refining Site located at 3901 Wyoming Avenue in Dearborn, Michigan (Site). This OMM Plan was prepared by GHD pursuant to the Removal Action Work Plan (Work Plan) dated November 2010, prepared on behalf of the NPOS Respondents to the Administrative Settlement Agreement and Order on Consent (Agreement), issued by the United States Protection Agency (U.S. EPA). The Site location is presented on Figure 1.1. The remediation "as-built" Site plan is presented on Figure 1.2. The current Site Plan is presented on Figure 1.3.

The OMM Plan became effective after the U.S. EPA approved the Construction Completion Report (November 2012) on March 30, 2013. The NPOS Respondents reserve the right to modify the current OMM Plan in the future to optimize Site OMM activities. U.S. EPA approval is required for all changes.

The NPOS Respondents were operating a Multi-Phase Extraction (MPE) System over 2012, 2013, and 2014 that was designed to extract mobile light non-aqueous phase liquids (LNAPL) for off-Site disposal (e.g., oil). This continued until April 3, 2014 when the U.S. EPA agreed that the NPOS Respondents could discontinue the LNAPL extraction and decommission the MPE System.

During the period from 2012 to 2015 methane gas (presumably from biodegradation of LNAPL [e.g., oil] and/or other fill materials) was detected on Site in gas probes, monitoring wells, and extraction wells in the unsaturated zone (mainly in the southwestern portion of the Site over the LNAPL). The methane results have been regularly reported in the Quarterly Progress Reports and have been the subject of evaluation with the U.S. EPA, NPOS Respondents, and the City of Dearborn that culminated with a November 5, 2014 conference call meeting. During the meeting it was decided to implement the following actions, modified in July 2015 consistent with the July 6, 2015 conference call:

- Renovate the 36 LNAPL extraction wells to passive gas vents
- Continue to complete field monitoring of methane during the monitoring events including the Site monitoring wells, passive gas vents, gas probes, and the sentry wells
- Amend the OMM Plan

Following an evaluation of monitoring data obtained to date, it was determined that revisions to add efficiency should be made to the OMM activities. OMM Amendment #3 presents the revised monitoring program, as identified below:

- Terminate the annual groundwater and vapor sampling event upon receipt of U.S. EPA approval of OMM Plan Amendment #3. Groundwater and vapor samples have been collected for laboratory analysis of volatile organic compounds (VOCs) since 2012 and 2014, respectively. There were no groundwater exceedances of the pertinent State of Michigan Act 451 Part 201 criteria. Also the Site deed restriction prohibits potable use of groundwater. The vapor analytical results are compared to the State of Michigan Media-Specific Volatilization to Indoor Air Interim Action Screening Levels, as requested by the U.S. EPA. However, there are no buildings present on Site, so generating this data has no purpose for any relevant risk receptors.
- Reduce the hydraulic and LNAPL monitoring schedule from quarterly to annually upon receipt of U.S. EPA approval of OMM Plan Amendment #3.
- Reduce the methane monitoring schedule from quarterly to semi-annually (spring and fall) upon receipt of U.S. EPA approval of OMM Plan Amendment #3. If it is determined that both semi-annual methane readings collected at a monitoring location are 25 percent greater than the highest previously observed methane reading collected at that location to date, and both methane readings are greater than 1.25 percent methane, further evaluation will be presented in the Annual Progress Report for that year. In general, the NPOS Respondents will review all the methane data and recommend proportionate actions dependent on location and health and safety issue. The NPOS Respondents will propose measures to address the methane increases to the U.S. EPA in the Annual Progress Reports, or immediately if there is an active emergency health and safety concern. Proposed measures may include continuing to evaluate the increase in methane levels during future semi-annual monitoring events, collection of additional methane readings, or additional measures to be proposed/evaluated based on the evaluation of the actual methane readings collected that year in comparison to previous methane readings.
- Reduce the total number of methane monitoring locations to 21 existing locations upon receipt of U.S. EPA approval of OMM Plan Amendment #3, with the majority of monitoring locations located on the perimeter of the Site. The passive vents would remain open to monitor the passive vents operating.
- Reduce the submittal of progress reports to the U.S. EPA from quarterly to annually upon receipt of U.S. EPA approval of OMM Plan Amendment #3. Each annual report will include a figure depicting both semi-annual methane readings (e.g. spring methane reading/fall methane reading). The Annual Progress Reports would be submitted to the U.S. EPA by December 31 of the same year the monitoring

results were collected. If the removal alternative is protective, each Annual Progress Report will include a certification stating the following:

"The Response Action appears to be effective and methane does not appear to be migrating from the Site, however; methane is present on the Ferrous Processing and Trading Company (FPT) property at and south of the Site boundary. Site use appears to be compliant with deed restrictions based on observations made during the semi-annual monitoring events. The Site, under City of Dearborn ownership, appears to pose no imminent and substantial threats to human health or the environment.

Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

1.2 BACKGROUND

The Response Action (RA) alternative included the following principal components as described in detail in the Construction Completion Report (November 2012):

1. A "prescribed" excavation and off-Site disposal of on-Site soils with polychlorinated biphenyl (PCB) concentrations greater than 100 milligrams per kilograms (mg/kg).
2. The decommissioning and demolition of the Site structures and the proper off-Site disposal of the debris.
3. Full Cover System (with a flexible membrane liner [FML]) that could be used for a parking or storage lot. The Cover System includes the placement of clean grading fill to properly shape the Site prior to placement of the FML and cap construction.
4. A MPE System for LNAPL removal within the central and southwestern portions of the Site and off-Site disposal of the collected LNAPL.
5. Deed restrictions and institutional controls (e.g., groundwater use and non-residential use restrictions, security fence, etc. and Standard of Care Plan).
6. OMM Plan (e.g., cap maintenance and repair, methane gas venting, groundwater and gas monitoring, etc.).

This OMM Plan presents the OMM requirements for the Cover System, methane gas passive venting, sentry wells, Site monitoring wells, gas probes, and activities required to fulfill deed restrictions. It should be noted that the NPOS Respondents/City of Dearborn

will communicate with future Site owners to ensure that all of the requirements for this OMM Plan are fully implemented. It should be noted that the City of Dearborn assumed the OMM requirements for the Cover System and deed restrictions on April 1, 2014 consistent with a request from U.S. EPA. The U.S. EPA has requested, and the NPOS Respondents have agreed, that this work be conducted by the NPOS Respondents upon execution of OMM Plan Amendment #3. The NPOS Respondents will assume the OMM requirements for the Cover System effective upon receipt of the U.S. EPA approval of OMM Plan Amendment #3. The City of Dearborn will continue to provide lawn maintenance/weed control, snow removal activities, fence maintenance, deed restriction control consistent with Site Owner responsibilities, and Site access for monitoring activities.

1.3 PURPOSE AND ORGANIZATION

The purpose of the OMM activities is to ensure the effective performance and integrity of the Cover System, methane gas venting, sentry wells, Site monitoring wells, and gas probes. The OMM requirements are dictated by Paragraphs 88(f) and 96(e) of the Agreement for the Site. The OMM Plan provides the long-term requirements to ensure the safe and effective ongoing performance of the OMM activities, and to provide ongoing reporting and evaluation. The OMM Plan is organized as follows:

- Section 1.0 - Presents an introduction, and the purpose and organization of the OMM Plan
- Section 2.0 - Provides OMM objectives and descriptions of the RA components
- Section 3.0 - Provides an organizational structure for the OMM activities
- Section 4.0 - Presents the OMM operation and maintenance requirements
- Section 5.0 - Presents the OMM monitoring requirements
- Section 6.0 - Presents the OMM reporting requirements
- Section 7.0 - Presents the Health and Safety Plan (HASP) for OMM activities
- Section 8.0 - Presents the references

2.0 DESCRIPTION

The specific objectives for OMM of the selected RA components are as follows:

- i) Maintain the integrity and effectiveness of the Cover System including routine maintenance and making repairs to the cap, as necessary, to correct the effects of settling, subsidence, erosion, or other events
- ii) Maintain the integrity of and repair damage to the stormwater management features including the Stormwater Retention Area, and associated outlet/overflow spillway
- iii) Maintain the integrity and effectiveness of the methane gas venting through the passive gas venting system
- iv) Maintain the integrity of the sentry wells and Site monitoring wells, and making repairs, as necessary
- v) Maintain the integrity of the gas probes and making repairs, as necessary
- vi) Perform and document hydraulic monitoring of select sentry wells and select Site monitoring wells to confirm LNAPL is not migrating
- vii) Maintain the effective performance of the RA by monitoring, ongoing evaluations, and documentation

The specific RA components that require OMM activities are as follows:

- Cover System
- Stormwater Retention Area and associated swale, grass-lined ditch, and berms
- Methane gas passive venting system
- Select sentry wells and select Site monitoring wells
- Gas probes
- Deed Restrictions

A description of each of the above Site components is presented in the following sections and monitoring and ongoing evaluation and documentation activities are described in Section 4.0.

The overall OMM activities are summarized in Table 2.1.

2.1 COVER SYSTEM

The Cover System at the Site was designed and constructed to maximize the utility of the Site as a gravel parking/storage lot to the extent feasible (see Figure 1.2). The remainder of the Cover System was completed as a grassed cover with storm water management features.

The Cover System has the following components (from bottom to top) in the gravel cover portion (24,221 square yards [sy] or 5.0 acres) of the Site:

- Grading Layer (varying thickness, as required) (clean clay was utilized for the grading layer)
- FML (40-mil high density polyethylene [HDPE])
- Geocomposite Drainage Net (for liner protection) with two layers of geotextiles (to increase the strength of the cap)
- Gravel Mix (12 inches)

For the grassed cover portion (8,311 sy or 1.72 acres), the Cover System has the following components (from bottom to top):

- Grading Layer (varying thickness, as required) (clean clay was utilized for the grading layer)
- FML (40-mil HDPE)
- Geotextile (two layers for liner protection) (to increase the strength of the cap)
- Common fill layer (6 inches)
- Vegetated Topsoil (variable, as required – up to 6 inches)

The Cover System also included the re-installation of the Site perimeter fence (portions of the Site), security signs, and the relocation of the Site entrance (with a new security gate), as presented on Figure 1.2.

2.1.1 STORMWATER RETENTION AREA AND ASSOCIATED SWALE, GRASS-LINED DITCH, AND BERMS

The stormwater management features of the Cover System consist of conveying runoff from the gravel area via a gentle swale within the gravel Cover System, as well as a wide, shallow grass-lined drainage ditch along the east property line (adjacent to Wyoming

Avenue) to direct surface water flow to the stormwater retention area in the southeastern corner of the Site that then discharges to Wyoming Avenue at street level. Surface water flow directions within the Cover System are presented on Figure 1.2.

The majority of the runoff from the Site is conveyed to the Stormwater Retention Area via overland flow to the swale within the central gravel portion of the Cover System. The swale within the gravel Cover System was designed based on the intended use of the Site (i.e., parking/storage lot) so the overall gravel area is fairly flat (approximately 1 percent grade) with the edges blending into the existing natural area contours.

The approximately 25-foot (ft) wide grass drainage ditch constructed along the east side of the Site running parallel to Wyoming Avenue captures a small portion of the Site surface water drainage, but the majority of the Site drains to the swale (Stormwater Retention Area) to the southeast of the gravel Cover System.

Sediments in the stormwater runoff from the gravel cap surface will be collected by the grass drainage ditch and grass stormwater retention area (the potential for sediment accumulation will be inspected during monitoring events). The Stormwater Retention Area is approximately 175 ft in length and 100 ft in width. Runoff from the stormwater retention area discharges to Wyoming Avenue via a 6-inch outlet pipe. The portion of outlet pipe within the retention area is perforated and buried with approximately 2 to 4 inch stone to prevent clogging. The outlet pipe discharges through the berm to the roadway using a cross sidewalk drain installed within the existing concrete sidewalk area located directly south of the existing asphalt driveway entrance.

The stormwater retention area also incorporates a 10-foot wide trapezoidal overflow weir that discharges surface runoff from larger storm events (i.e., 100-year storm). The invert of the overflow weir was positioned approximately 2 ft above the bottom of the Stormwater Retention Area.

2.1.2 DEED RESTRICTIONS

As required by the Agreement, the City of Dearborn executed an amended Restrictive Covenant on March 18, 2016 and recorded it with the Wayne County Register Of Deeds. This Restrictive Covenant included the following deed restrictions:

- A non-residential zoning designation
- Prohibition of groundwater use on Site

- Maintaining the Site Cover System, fencing, and signs

Within 30 days of receipt of U.S. EPA approval of the OMM Plan Amendment #3, a revised draft of the Restrictive Covenant addressing current Site conditions will be submitted to the U.S. EPA for review. The revised draft Restrictive Covenant will then subsequently be submitted to the City of Dearborn for review and execution. Additionally, a Standard of Care Plan is provided in Appendix A of this OMM Plan. All owners or operators of the Site have to comply with the Standard of Care Plan to operate the Site in a protective fashion (e.g., equivalent to a Due Care Plan consistent with Michigan Act 451).

2.2 METHANE GAS VENTING SYSTEM (GAS VENTS)

The methane gas venting system includes 36 gas vents (LNAPL extraction wells renovated as methane gas vents) located at the southwest corner of the Site and two passive ventilation trenches (PVTs) located at the north and south Site boundaries that passively vents any methane gas that is present below the Site. Methane monitoring will occur at the Site in select monitoring wells, passive gas vents, and gas probes during monitoring events (refer to Appendix B for logs). Monitoring details are presented in Section 5.0.

2.3 SENTRY WELLS AND SITE MONITORING WELLS

The monitoring well network consists of five sentry wells and 12 groundwater monitoring wells. The sentry wells (MW11-12, MW13-12, MW14-12, MW15-12, and MW16-12) were installed downgradient of the Site, as presented on Figure 1.2 to determine if the LNAPL is migrating off Site. LNAPL was not observed in the sentry wells to date.

The Site monitoring wells include MW1-08, MW2-08, MW3R-08, MW4-08, MW5-08, MW6-10, MW7-10, MW8-10, MW9-10, MW10-10, TW-1, and TW-2, as presented on Figure 1.2.

The sentry well construction logs are presented in Appendix B. Well construction details are presented in Table 2.2. Monitoring details are presented in Section 5.0.

2.4 GAS PROBES

Two gas probes were installed along each side of the Site for a total of eight gas probes (GP-1, GP-2, GP-3, GP-4, GP-5, GP-6, GP-7, and GP-8), as presented on Figure 1.2, for monitoring the gas pressure and concentration along the Site perimeter to assess the potential for vapor intrusion of methane or other chemicals onto the neighboring properties.

The gas probe construction logs are presented in Appendix B. Gas Probe construction details are presented in Table 2.2. Monitoring details are presented in Section 5.0.

3.0 ORGANIZATIONAL STRUCTURE

Figure 3.1 presents the Site organizational structure for the implementation of the OMM Plan.

The duties include, but are not necessarily limited to, the following:

- The overall management of the inspection and maintenance requirements
- The preparation and submittal of reports to the U.S. EPA documenting OMM activities
- Financial accounting for supply and equipment purchases and disbursements associated with the OMM activities
- Attendance at meetings regarding the OMM activities
- Provide liaison for the Site with various Agency representatives, contractors, and suppliers regarding the OMM activities

4.0 OPERATION AND MAINTENANCE

Operation and maintenance requirements for the RA components include routine inspection, routine or scheduled maintenance, unscheduled maintenance, and record keeping of these activities.

4.1 INSPECTION AND MAINTENANCE

4.1.1 INSPECTION AND MAINTENANCE RECORDS

Inspections and routine and unscheduled maintenance activities will be documented on Field Forms. The Field Forms are provided in Appendix C. The Field Forms will be maintained and filed.

4.1.2 INSPECTIONS

Routine inspections of the various RA components were/will be performed at the following minimum frequencies:

- Quarterly from April 1, 2013 to receipt of U.S. EPA approval of OMM Plan Amendment #3.
- Semi-annually from receipt of U.S. EPA approval of OMM Plan Amendment #3.

Additional inspections may be conducted, as required. The inspections will include the following RA components:

- Cover System
- Stormwater management features including the berms, swale, grass-lined ditch, and the Stormwater Retention Area
- Methane Gas Venting System (gas vents)
- Sentry wells and monitoring wells
- Gas probes
- Perimeter security fence, signs, etc.

4.1.3 COVER SYSTEM

Neither the City of Dearborn nor the NPOS Respondents will be accessing or using the Site, except for the operation and maintenance and periodic monitoring of the on-Site wells and gas probes. The NPOS Respondents completed the Cover System inspection and maintenance for 1 year beginning April 1, 2013 (April 1, 2013 to March 31, 2014). The City of Dearborn participated in quarterly inspections during that year for training and transition. Since April 1, 2014, the City of Dearborn has agreed to undertake sole responsibility for Cover System inspections and maintenance, consistent with the Paragraph 96(e) of the Agreement. Note: AOC paragraph 96(e) specifies deed restrictions. Previously, the City of Dearborn agreed to conduct the work at the request of the U.S. EPA until March 30, 2023, however as of execution of this OMM Plan Amendment #3, the Respondents agreed to conduct OMM requirements for the Cover System at the request of the U.S. EPA.

Inspections

The routine inspections will be conducted by inspecting the entire Site to observe and determine the presence of exposed geotextile fabric (and potential geocomposite and/or liner damage), surface erosion and sloughing, areas bare of vegetation, and subsidence or settlement. During the inspection, the Site perimeter security fence and associated signs will be inspected to determine damage and/or other conditions that require repair. The inspection will be documented on a form (Appendix C).

Maintenance

Significant problems identified by the periodic routine inspections and requiring unscheduled maintenance will be rectified within 2 months of their observance, except for items where implementation of repairs are seasonally dependent or where implementation is delayed due to longer lead times for contractor, equipment, or material availability. In such cases, problems will be substantially rectified by the next quarter, if possible. Delays beyond 2 months will require U.S. EPA concurrence. Cover System maintenance repairs may include the following:

- Necessary addition and compaction of gravel at the surface of the gravel area of the Cover System
- Larger repairs of the gravel cover
- Repairing damage to the FML and geocomposite by trained contractors
- Repairing damage to the property fence, gates, and security signs
- Re-seeding and fertilizing of the vegetative cover or of the earthen berm, as necessary

- Grading or repair of the Site entrance
- Repairing surficial erosion and sloughing of the earthen berm
- Repairing damage caused by burrowing wildlife, the presence of deep-rooted weeds, or other foreign vegetation, and wind damage
- Housekeeping and litter disposal

4.1.4 STORMWATER RETENTION AREA AND ASSOCIATED SWALE, GRASS-LINED DITCH, AND BERMS

Regular inspections and routine and unscheduled maintenance activities will be conducted to maintain the Site stormwater management system in a manner consistent with the Cover System. The control features include: a gentle swale within the gravel Cover System, a shallow grass-lined drainage ditch along the east property line (adjacent to Wyoming Avenue), Stormwater Retention Area outlet to discharge flow to Wyoming Avenue, Stormwater Retention Area overflow spillway to prevent flooding located in the southeast corner, and vegetation on the berms to prevent erosion.

Inspections

The stormwater features will be inspected to ensure that they are in good operating condition.

The inspections will be conducted to observe and determine the presence of problems with outlet structures, the gravel swale and grass-lined drainage ditch, and the Stormwater Retention Area. Potential problems may include sediment accumulation (i.e., greater than 6 inches within the Stormwater Retention Area); debris causing obstructions; visible signs of erosion; quality of vegetation; signs of seepage through the berm; accumulation of trash in and around the Stormwater Retention Area or swale; and other conditions that may require repairs. The inspection will be documented on a form (Appendix C).

Maintenance

Significant problems identified by the routine inspections will be rectified within 2 months of their observance, except for items where implementation of repairs are seasonally dependent or where implementation is delayed due to longer lead times for contractors, equipment, or materials availability. In such cases, the problems will be substantially rectified by the next quarter, if possible. Delays beyond 2 months will

require U.S. EPA concurrence. Stormwater Retention Area and associated swale, grass-lined ditch, and berms maintenance/repairs may include:

- Removal of accumulated sediment and/or litter in swale, the grass-lined ditch, the Stormwater Retention Area, and associated outlet and overflow spillway
- Removal of unwanted vegetation (e.g., weeds)
- Repairs to stormwater system outlets and overflow structures
- Repair of undercut or eroded areas
- Seeding and/or fertilizing of ground cover to restore vegetation, as necessary

4.1.5 METHANE GAS VENTING SYSTEM (GAS VENTS)

Inspections

The passive vents and trenches will be allowed to continually vent methane or gas from the Site. During the monitoring events, the gas vents will be inspected and any necessary maintenance will be completed. Monitoring details are presented in Section 5.0.

Maintenance

Significant problems identified by the regular inspections and requiring unscheduled maintenance will be rectified within 2 months of their observance, except for items where implementation of repairs are seasonally dependent or where implementation is delayed due to longer lead times for contractors, equipment, or materials availability. In such cases, problems will be substantially rectified by the next quarter, if possible. Delays beyond 2 months will require U.S. EPA concurrence.

4.1.6 SENTRY WELLS AND SITE MONITORING WELLS

Inspections

Regular inspection and maintenance of select sentry and monitoring wells will be conducted during each monitoring event and will include the following:

- Condition of the well casing and the lock
- Check for sediment buildup in bottom of well

- Conditions of surface seal around the well

Monitoring details are presented in Section 5.0.

Maintenance

Significant problems identified by the regular inspections and requiring unscheduled maintenance will be rectified within 2 months of their observance, except for items where implementation of repairs are seasonally dependent or where implementation is delayed due to longer lead times for contractors, equipment, or materials availability. In such cases, problems will be substantially rectified by the next quarter, if possible. Delays beyond 2 months will require U.S. EPA concurrence. Sentry well and Site monitoring well maintenance may include:

- Oiling the lock away from the well or replacement of lock
- Maintaining access to each well by removing weeds and brush in area surrounding the well, as required
- Repairing damaged monitoring well casings or locks
- Redevelopment of wells
- Replacement/abandonment of wells

4.1.7 GAS PROBES

Inspections

Regular inspection and maintenance of the gas probes will be conducted during each monitoring event and will include the following:

- Condition of the gas probe casing and the lock
- Conditions of surface seal around the gas probe

Monitoring details are presented in Section 5.0.

Maintenance

Significant problems identified by the regular inspections and requiring unscheduled maintenance will be rectified within 2 months of their observance, except for items where implementation of repairs are seasonally dependent or where implementation is delayed

due to longer lead times for contractors, equipment, or materials availability. In such cases, problems will be substantially rectified by the next quarter, if possible. Delays beyond 2 months will require U.S. EPA concurrence. Gas probe maintenance may include:

- Oiling the lock away from the gas probes or replacement of lock
- Maintaining access to each gas probe by removing weeds and brush in area surrounding the well, as required
- Repairing damaged gas probe casings or locks
- Replacement/abandonment of gas probes

5.0 MONITORING

5.1 SENTRY WELLS AND SITE MONITORING WELLS

The sentry wells were monitored quarterly through receipt of U.S. EPA approval of OMM Plan Amendment #3. Subsequent monitoring will include annual hydraulic and LNAPL monitoring.

The Site monitoring wells were monitored quarterly through receipt of U.S. EPA approval of OMM Plan Amendment #3. Subsequent monitoring will include annual hydraulic and LNAPL monitoring and semi-annual methane monitoring.

Groundwater samples were collected from five Site monitoring wells for laboratory analysis of VOCs from 2014 through receipt of U.S. EPA approval of OMM Plan Amendment #3. OMM Plan Amendment #3 identifies the termination of the annual sampling event, as there were no groundwater exceedances of the pertinent State of Michigan Act 451 Part 201 criteria and the Site deed restriction prohibits potable use of groundwater.

A summary of the monitoring schedule is presented in Table 2.1. A summary of the wells included for hydraulic, LNAPL, and methane monitoring is presented in Table 5.1. Well monitoring and maintenance documentation forms are presented in Appendix C.

Summary reports were submitted to the U.S. EPA on a quarterly basis through U.S. EPA approval of OMM Plan Amendment #3. Annual reports are to be submitted to the U.S. EPA following receipt of U.S. EPA approval of OMM Plan Amendment #3. The reports include a summary and results of the field activities completed. The U.S. EPA will be notified immediately if greater than one eighth of an inch of LNAPL is present in any of the sentry wells.

5.2 GAS PROBES AND GAS VENTS

The eight gas probes were monitored for pressure and methane on a quarterly basis to receipt of U.S. EPA approval of OMM Plan Amendment #3. Gas probe pressure monitoring will continue to be completed annually and methane monitoring will be completed semi-annually. Gas vent LNAPL monitoring will be completed annually and methane monitoring will be completed semi-annually following receipt of U.S. EPA approval of OMM Plan Amendment #3. The gas vents will remain open at all times including during all monitoring events.

A summary of the monitoring schedule is presented in Table 2.1. A summary of the gas probes and gas vents included for pressure, methane, and/or LNAPL monitoring is presented in Table 5.1.

The results will be presented in the Annual Progress Report and evaluated to determine if the vapor pressure is sufficiently high enough to indicate a potential for off-Site migration.

Digital Manometer

The digital manometer will be is used to measure both static and differential pressures of the gas probes. The manometer will measure pressure/vacuum in the range of 0 to 40.0 in water column (WC) pressure or vacuum with a measurement accuracy of ± 0.1 . Static pressure will be measured relative to atmospheric pressure by connecting the positive (+) tubing lead from the manometer to the monitoring port. The pressure will only be recorded once the monitoring port ball valve is opened and pressure equilibrium is attained. Any fluctuating/pulsating pressures will also be noted.

Care will be taken when obtaining pressure readings to insure that connections are tightly sealed. Any liquid in the monitoring tubes will cause errors in the readings taken.

6.0 REPORTING

Progress Reports were submitted to the U.S. EPA quarterly to receipt of U.S. EPA approval of OMM Plan Amendment #3 followed by Annual Progress Reports. The Progress Reports include the results and evaluation of all OMM activities conducted during the inspection period. The Progress Reports will detail any corrective action that was taken to address any deficiencies at the Site. Any future changes in the monitoring schedule or monitoring points will be proposed to the U.S. EPA in the Annual Progress Reports. The Annual Progress Reports would be submitted to the U.S. EPA by December 31 of the same year the monitoring results were collected.

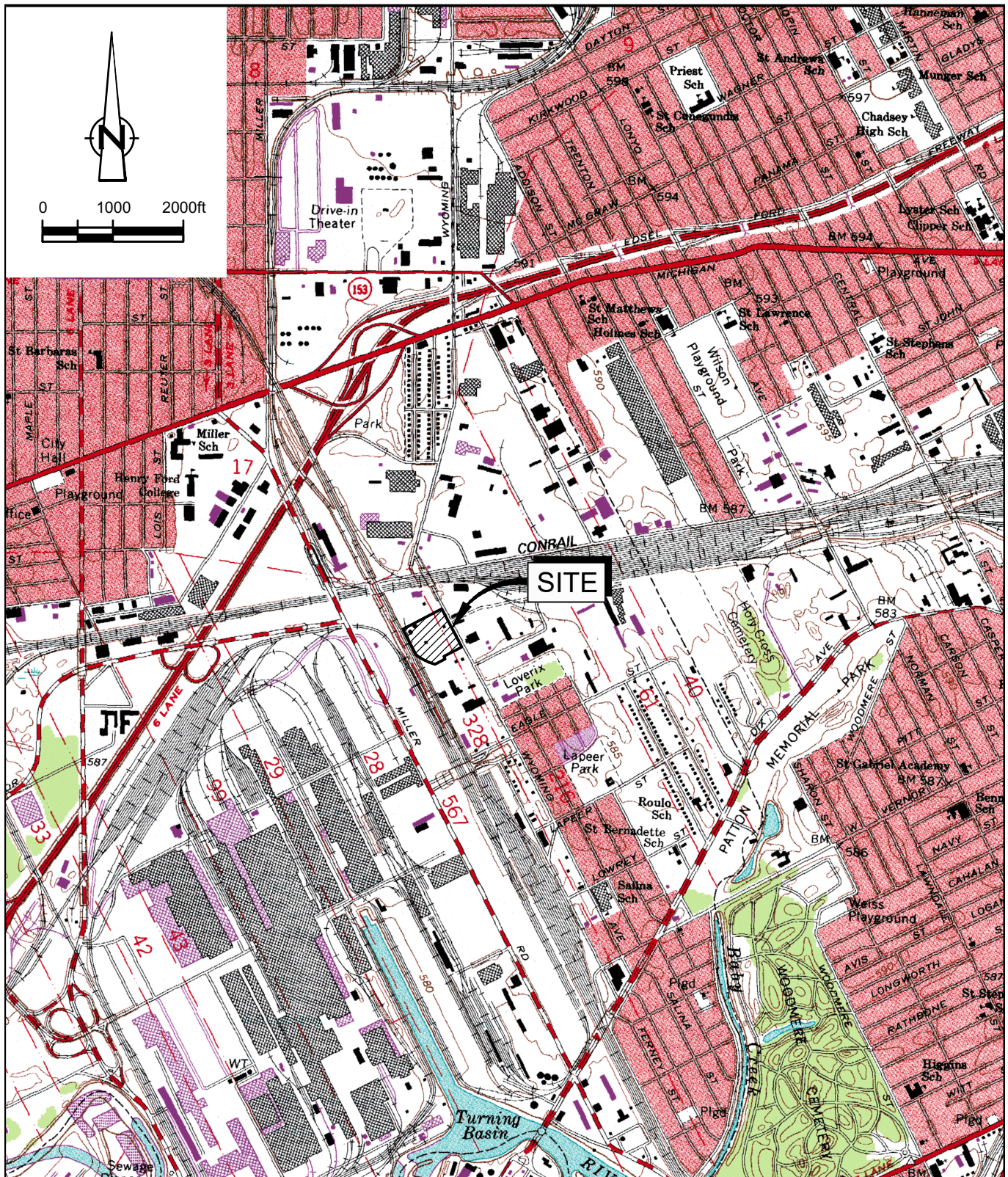
7.0 OMM HEALTH AND SAFETY PLAN (HASP)

A HASP is required to describe the health and safety procedures to be implemented during the Site OMM activities. The HASP provided in Appendix A of the RA Work Plan, Environmental Media dated November 2010 (Conestoga-Rovers & Associates, Inc. [CRA], currently GHD, 2010) will be used for the routine inspections, maintenance, and monitoring. The HASP will be updated, as necessary, to ensure that it covers any non-routine or new OMM activities.

In addition, a HASP would need to be prepared prior to completing any maintenance activities, which involve excavation beneath the Cover System consistent with the Standard of Care Plan (Appendix A).

8.0 REFERENCES

- ASTM International, 2007, E 2531-06: Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Non-Aqueous-Phase Liquids Released to the Subsurface. ASTM Committee E50 on Environmental Assessment, Risk management and Corrective Action, ASTM International, West Conshohocken, PA, February 2007.
- CRA, 2010a, Site Investigation Report, Dearborn Refining Site, Dearborn, Michigan. April 13, 2010.
- CRA, 2010b, Removal Action Work Plan, Environmental Media, Dearborn Refining Site, Dearborn, Michigan. November 26, 2010.
- CRA, 2011, Demolition, Prescribed Excavation, and Cover System Final (100%) Design Dearborn Refining Site, Dearborn, Michigan. July 26, 2011.
- CRA, 2012, Construction Certification Report Dearborn Refining Site, Dearborn, Michigan. November 30, 2012.
- ITRC, 2009, Evaluating LNAPL Remedial Technologies for Achieving Project Goals. LNAPL-2. Washington, DC: Interstate Technology & Regulatory Council, LNAPLs Team. www.itrcweb.org.
- U.S. EPA, 2005, A Decision-Making Framework for Cleanup of Sites Impacted with Light Non-Aqueous Phase Liquids (LNAPL). Remediation Technologies Development Forum, NAPL Cleanup Alliance, Office of Solid Waste and Emergency Response, EPA 542-R-04-011, March 2005. www.clu-in.org.



SOURCE: USGS QUADRANGLE MAP;
DEARBORN, MICHIGAN
PHOTO REVISED 1983



DEARBORN

figure 1.1
SITE LOCATION
OPERATION, MAINTENANCE AND MONITORING PLAN
DEARBORN REFINING SITE
Dearborn, Michigan

GRASS COVER SYSTEM

RAILWAY TRACKS

STORMWATER RETENTION AREA

PROPERTY LINE
AND SECURITY FENCE

TYPICAL GRAVEL COVER SYSTEM STRUCTURE

TYPICAL ANCHOR TRENCH

SECURITY FENCE
GATE

LEGEND

- NOTE:
FLEXIBLE TUBING CONNECTING EXTRACTION NETWORK PIPING
TO EXTRACTION WELLS IS NOT PRESENTED ON FIGURE.

GENERAL NOTE

THE POSITION OF THE POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS; AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED OR CONFIRMED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE POSITION AND EXACT LOCATION OF ALL SUCH UTILITIES AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM MADE DURING THE COURSE OF THE CONTRACT WORK.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

DRAWING STATUS

Status	Date	Initial

DEARBORN REFINING SITE
DEARBORN, MICHIGAN

OPERATION, MAINTENANCE AND MONITORING PLAN
--

SITE PLAN
AS-BUILT



Source Reference:
SITE LAYOUT MAP WESTON (11/21/2006), CERTIFIED SURVEY, CONESTOGA-ROVERS &
ASSOCIATES, Inc., 04/16/2008. AND SURVEY MAY 02, 2011,
EQ SURVEY JULY 30, 2012 AND OCTOBER 18, 2012

Project Manager: G.T.		Reviewed By:	Date: NOVEMBER 2012
Scale: AS SHOWN	Project N°: 48041-00	Report N°: 018	Drawing N°: figure 12

AS-BUILT DRAWINGS

AS-BUILT DRAWINGS

THIS AS-BUILT DRAWING HAS BEEN PREPARED, IN PART, BASED ON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, CRA CAN NOT AND DOES NOT WARRANT ITS ACCURACY AND/OR COMPLETENESS, AND THIS SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED HEREIN AS A RESULT. THOSE RELYING ON THIS AS-BUILT DRAWING ARE ADVISED TO OBTAIN VERIFICATION OF ITS ACCURACY AND/OR COMPLETENESS BEFORE USING IT FOR ANY PURPOSE.

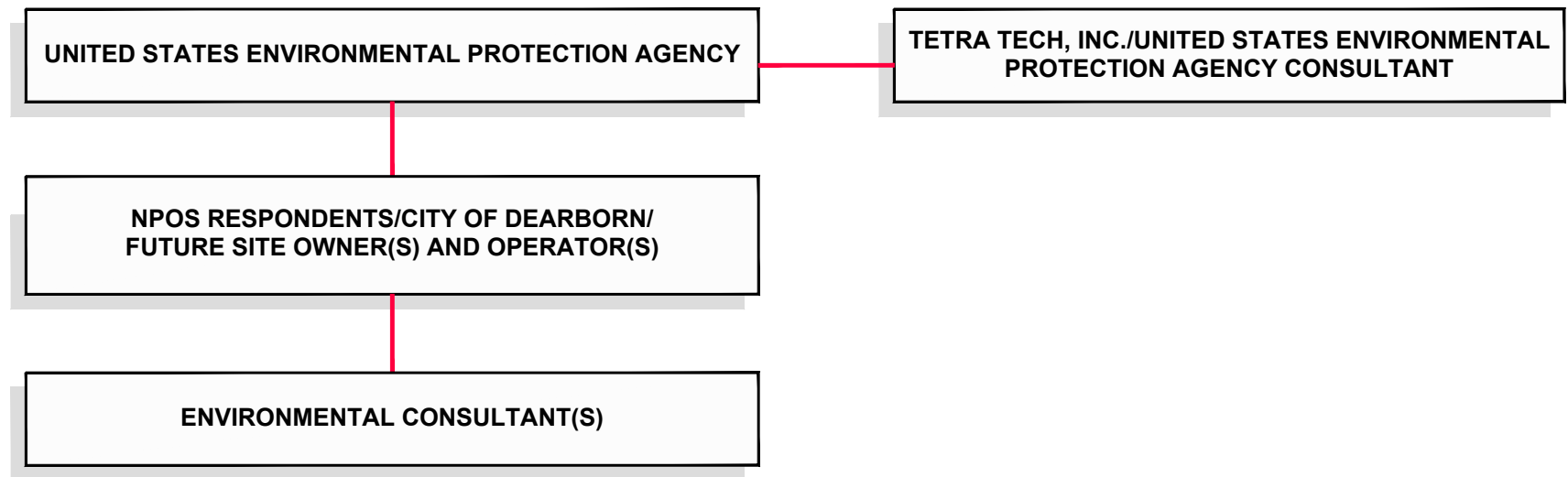


figure 3.1
PROJECT ORGANIZATIONAL CHART
OPERATION, MAINTENANCE AND MONITORING PLAN
DEARBORN REFINING SITE
Dearborn, Michigan



TABLE 2.1
MONITORING AND MAINTENANCE SCHEDULE
DEARBORN REFINING SITE
DEARBORN, MI

<i>Location</i>	<i>Component</i>	<i>Monitoring/ Inspection Frequency To Receipt of U.S. EPA Approval of OMM Plan Amendment #3</i>	<i>Monitoring/ Inspection Frequency Upon Receipt of U.S. EPA Approval of OMM Plan Amendment #3</i>
Site Monitoring Wells	Hydraulic and LNAPL Monitoring	quarterly	annually
	Methane Monitoring		semi-annually
	Inspections		semi-annually
	Chemical Monitoring	annually	not applicable
Sentry Wells	Hydraulic and LNAPL Monitoring	quarterly	annually
	Methane Monitoring		not applicable
	Inspections		semi-annually
Gas Probes	Pressure Monitoring	quarterly	annually
	Methane Monitoring		semi-annually
	Inspections		semi-annually
	Chemical Monitoring	annually	not applicable
Gas Vents	LNAPL Monitoring	quarterly	annually
	Methane Monitoring		semi-annually
	Inspections		semi-annually
	Chemical Monitoring	annually	not applicable
Cover System	Inspections and Maintenance	quarterly	semi-annually
Stormwater Retention Area and Associated Swales and Berms	Inspections and Maintenance	quarterly	semi-annually

TABLE 2.2

WELL AND GAS PROBE CONSTRUCTION DETAILS
CONSTRUCTION CERTIFICATION REPORT
DEARBORN REFINING SITE
DEARBORN, MICHIGAN

Location	Completion Date	Ground Elevation	Top of Riser Elevation	Depth of Boring (ft bgs)	Screen Depth (ft bgs)
Extraction Wells					
GV-1	8/13/12	590.39	592.39	25	5 - 25
GV-2	8/28/12	589.75	591.79	26	5 - 20
GV-3	8/28/12	589.47	591.54	31	6 - 26
GV-4	8/29/12	589.12	591.21	26	5 - 20
GV-5	8/29/12	589.46	591.52	30.5	6 - 26
GV-6	8/29/12	589.85	591.75	12	7 - 12
GV-7	8/14/12	590.52	592.51	20	5 - 20
GV-8	8/28/12	589.92	591.96	46	5 - 20
GV-9	8/28/12	589.62	591.66	26	5 - 20
GV-10	8/28/12	589.21	591.24	26	5 - 20
GV-11	8/29/12	589.13	591.18	26.5	6 - 26
GV-12	8/27/12	589.25	591.32	25.5	5 - 20
GV-13	8/15/12	590.34	592.40	20.5	5 - 20
GV-14	8/17/12	590.18	592.22	25.5	5 - 20
GV-15	8/20/12	589.70	591.69	25.5	5 - 20
GV-16	8/28/12	589.22	591.22	26	5 - 20
GV-17	8/29/12	588.82	590.86	30.5	5 - 25
GV-18	8/29/12	589.33	591.29	25.5	5 - 20
GV-19	8/15/12	590.24	592.29	20.5	5 - 20
GV-20	8/16/12	590.37	592.41	25.5	5 - 20
GV-21	8/17/12	590.10	592.08	25.5	5 - 20
GV-22	8/21/12	589.45	591.45	26	5 - 20
GV-23	8/28/12	589.24	591.15	25.5	5 - 20
GV-24	8/24/12	588.98	591.04	25.5	5 - 20
GV-25	8/16/12	590.48	592.44	25	5 - 25
GV-26	8/20/12	590.11	592.13	26	5 - 20
GV-27	8/20/12	589.82	591.85	16	5 - 20
GV-28	8/23/12	589.19	590.77	25.5	5 - 20
GV-29	8/23/12	589.22	590.83	20.5	5 - 20
GV-30	8/24/12	590.58	592.58	21	5 - 20
GV-31	8/21/12	590.03	592.00	25.5	5 - 20
GV-32	8/22/12	589.35	591.39	25	5 - 20
GV-33	8/23/12	589.45	591.45	25	5 - 20
GV-34	8/21/12	587.55	589.61	20	5 - 20
GV-35	8/22/12	586.62	588.67	20	5 - 20
GV-36	8/22/12	586.80	588.82	20	5 - 20
TW-1	11/07/09	589.26	591.22	25	2 - 18
TW-2	10/28/09	589.27	590.92	20	2 - 18
MW6-10	4/13/11	589.36	591.56	25	3 - 18
MW7-10	4/12/11	589.00	591.01	25	3 - 18
MW8-10	4/12/11	589.28	591.18	25	4 - 19
MW9-10	4/14/11	588.74	590.43	25	3 - 18
MW10-10	4/13/11	587.08	588.52	25	3 - 18
Gas Probes					
GP1-12	8/30/12	590.91	NA	10	4 - 5
GP2-12	8/30/12	589.83	NA	10	4 - 5
GP3-12	8/30/12	588.37	NA	10	4 - 5
GP4-12	8/30/12	587.93	NA	10	4 - 5
GP5-12	8/30/12	588.73	NA	10	4 - 5
GP6-12	8/30/12	586.54	NA	10	3 - 4
GP7-12	8/30/12	588.71	NA	10	4 - 5
GP8-12	8/30/12	588.88	NA	10	3 - 4
Sentry Wells					
MW11-12	9/05/12	586.97	587.19	15	4 - 14
MW12-12 ⁽¹⁾	NA	NA	NA	NA	NA
MW13-12	9/06/12	586.98	586.78	20	3 - 19
MW14-12	9/04/12	587.01	586.81	20	3 - 19
MW15-12	9/04/12	587.64	587.26	20	7 - 19
MW16-12	9/04/12	587.01	586.67	15	4 - 14
Perimeter Wells					
MW1-08	3/03/08	591.59	591.41	30	3.5 - 18.5
MW2-08	3/3/08	590.65	590.64	10	3 - 7
MW3R-08	9/18/08	586.15	587.87	25	3.5 - 18.5
MW4-08	3/24/08	590.43	590.35	20	3 - 16
MW5-08	3/24/08	587.55	587.11	15	2 - 10

Notes:

- (1) MW12-12 was not installed because a scrap pile was present on the property. U.S. EPA agreed that the monitoring well was not required.
- ft bgs Feet below ground surface.
- NA Not Applicable.
- GV Extraction wells converted to methane gas vents.

TABLE 5.1

**HYDRAULIC AND VAPOR MONITORING LOCATIONS
DEARBORN REFINING SITE
DEARBORN, MICHIGAN**

<i>Well Identification</i>	<i>Hydraulic and LNAPL Monitoring</i>	<i>Methane Monitoring</i>	<i>Pressure Monitoring</i>
Northern Property Boundary			
GP1-12	NM	X	X
GP2-12	NM	X	X
GV3-15	NM	X	NM
GV4-15	NM	X	NM
MW1-08	X	X	NM
Eastern Property Boundary			
GP3-12	NM	X	X
GP4-12	NM	X	X
MW2-08	X	X	NM
Western Property Boundary			
GP7-12	NM	X	X
GP8-12	NM	X	X
MW4-08	X	X	NM
MW5-08	X	X	NM
Southern Property Boundary			
GP5-12	NM	X	X
GP6-12	NM	X	X
MW3R-08	X	X	NM
MW10-10	X	X	NM
EX-34	X	X	NM
GV10-17	NM	X	NM
Central Property Boundary			
MW7-10	X	X	NM
MW8-10	X	X	NM
MW9-10	X	X	NM
Ferrous Processing & Trading Company			
MW13-12	X	NM	NM
MW14-12	X	NM	NM
MW15-12	X	NM	NM
Total			
Total Locations Monitored	13	21	8

Acronyms/Notes:

LNAPL - light non-aqueous phase liquid

NM - Not Monitored

X - Monitored

Appendices

Appendix A
Standard of Care Plan
(Provided as a separate document)

Appendix B

Extraction Well, Sentry Well, and Gas Probe Logs

APPENDIX B

EXTRACTION WELL, SENTRY WELL, AND GAS PROBE LOGS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

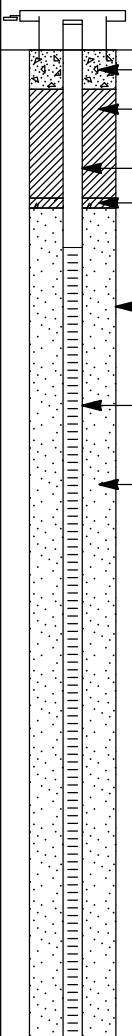
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-1

DATE COMPLETED: August 13, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00	CONCRETE	1SH		100		-
	GEOMEMBRANE/LINER	1.05	BENTONITE GROUT					0.3
2	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, poorly graded, low plasticity, stiff, brown, moist		4" PVC WELL CASING	2GP		75		
4	- slightly mottled at 2.3ft BGS	4.25	BENTONITE CHIPS					0.1
	- 6" rock debris at 3.8ft BGS	4.75						
6	SP-SAND (FILL), fine grained, compact, brown, moist	6.25						3.5
8	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, poorly graded, low plasticity, stiff, brown, moist		10" BOREHOLE	3GP		70		
	- trace staining at 5.0ft BGS	9.50	4" PVC WELL SCREEN					2.4
10	SP-SAND (FILL), with bottom ash, glass, coal, slag, brick and wood debris, fine grained, compact, brown, moist		SAND PACK					6.0
12	CL-SILTY CLAY (FILL), low plasticity, firm, olive green, moist, mottled, staining, slight oil-like odor			4GP		55		
14	- no staining at 11.0ft BGS	14.50						0.8
	FLY ASH AND LIME, grayish green	15.10						
16	SP-SAND (FILL), with silt, trace gravel, fine to medium sand, fine to coarse gravel, poorly graded, compact, brown, wet	16.00		5GP		30		0.2
18	CL-SILTY CLAY (FILL), low plasticity, firm, olive green, moist, mottled, staining							0.2
20		20.50						0.1
22	CL-SILTY CLAY, low plasticity, soft, brown, moist			6GP		55		
24		25.00						0.1
26	END OF BOREHOLE @ 25.0ft BGS							
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
Screened interval:
5.00 to 25.00ft BGS
Length: 20ft
Diameter: 4in
Slot Size: 0.010
Material: WIRE WRAPPED PVC
Seal:
3.75 to 4.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
4.00 to 25.00ft BGS
Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

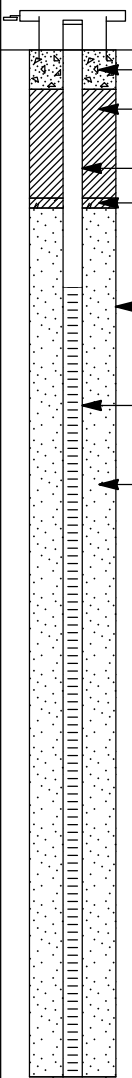
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-3

DATE COMPLETED: August 28, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25	CONCRETE	1SH		100		-
2	GEOMEMBRANE/LINER	1.30	BENTONITE GROUT					
	CL-SANDY CLAY (FILL), trace concrete debris and gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist		4" PVC WELL CASING	2GP		100		0.1
4	- silty clay, trace sand, mottled at 2.8ft BGS		BENTONITE CHIPS					0.4
	- olive green at 3.3ft BGS							
6	- sandy clay, trace silt, dark brown at 4.8ft BGS		10" BOREHOLE					134.1
	- trace concrete debris at 5.3ft BGS	6.25						
8	SP-SAND (FILL), with brick debris, trace clay, fine grained, compact, black, moist, staining, petroleum-like odor		4" PVC WELL SCREEN	3GP		55		150.4
10	- with bottom ash, slag, glass and wood debris, trace brick and concrete debris, loose to compact, wet at 7.5ft BGS		SAND PACK					
12				4GP		0		-
14								-
16								37.7
18				5GP		5		
20								
22								
24				6GP		5		7.4
26	CL-CLAY, trace silt, low plasticity, firm, gray, moist	26.00						0.4
28				7GP		65		0.1
30								
32	END OF BOREHOLE @ 31.0ft BGS	31.00						
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-4

PROJECT NUMBER: 048041

DATE COMPLETED: August 29, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1.00	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00	CONCRETE	1SH		100		--
1.05	GEOMEMBRANE/LINER	1.05	BENTONITE GROUT					0.1
2	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist		4" PVC WELL CASING	2GP		100		0.4
4	- with silt, slightly mottled at 3.3ft BGS		BENTONITE CHIPS					
6	- 3" concrete debris at 5.5ft BGS	6.00	10" BOREHOLE					6.7
8	SP-SAND (FILL), trace clay, bottom ash and slag, fine grained, compact, black, moist, staining, slight oil-like odor		4" PVC WELL SCREEN	3GP		70		29.2
10	- with concrete debris, gray at 7.0ft BGS		SAND PACK					32.8
12	- with bottom ash, slag, trace brick and wood debris, no concrete at 8.3ft BGS			4GP		50		88.7
14	- wet at 9.0ft BGS							
16	- loose to compact at 10.5ft BGS			5GP		5		67.1
18								
20								
22	CL-CLAY, with silt, low plasticity, firm to stiff, brown, moist	21.00		6GP		70		3.3
24	- trace fine sand, soft at 25.0ft BGS							1.2
26	END OF BOREHOLE @ 26.0ft BGS	26.00	WELL DETAILS Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND					
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

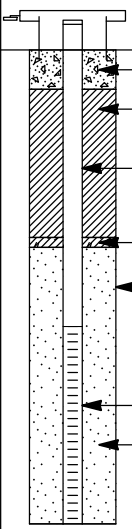
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-6

DATE COMPLETED: August 13, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00	 <p>CONCRETE BENTONITE GROUT 4" PVC WELL CASING BENTONITE CHIPS 10" BOREHOLE 4" PVC WELL SCREEN SAND PACK</p> <p><u>WELL DETAILS</u> Screened interval: 7.00 to 12.00ft BGS Length: 5ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 4.75 to 5.00ft BGS Material: BENTONITE CHIPS Sand Pack: 5.00 to 12.00ft BGS Material: SAND</p>	1SH		100		-
2	GEOMEMBRANE/LINER	1.05		2GP				0.4
4	CL-SANDY CLAY (FILL), trace gravel, fine sand, fine to coarse gravel, low plasticity, stiff, brown, moist					100		0.4
4	- 2" concrete debris at 3.5ft BGS			3GP				0.1
4	- silty clay, trace sand and gravel, mottled at 4.0ft BGS							0.1
6	- 2" concrete debris at 4.5ft BGS	5.85						6.9
6	- sandy clay, firm at 5.0ft BGS							1.1
8	SP-SAND (FILL), with silt, trace gravel, fine to medium sand, fine gravel, poorly graded, compact, brown, moist			4GP		70		
8	- wet at 6.0ft BGS							
10				4GP		80		
12	SP/GP-SAND AND GRAVEL (FILL), with concrete and slag, fine sand, fine to coarse gravel, poorly graded, dense, gray, moist	12.25						
14								
16	- REFUSAL at 15.5ft BGS	15.50						
16	END OF BOREHOLE @ 15.5ft BGS							
18								
20								
22								
24								
26								
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

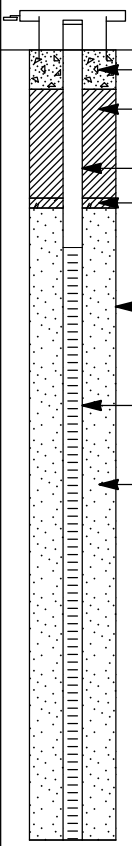


STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-7
DATE COMPLETED: August 14, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist			1SH		100		-
2	GEOMEMBRANE/LINER	1.50						0.0
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		1.9
4	- silty clay, trace sand and gravel, mottled at 3.0ft BGS	3.75						
	- olive green at 3.5ft BGS	4.65						
6	SP/GP-SAND AND GRAVEL (FILL), fine sand, fine to coarse gravel, poorly graded, compact, brown, moist	4.80						0.7
8	- with concrete debris at 4.0ft BGS			3GP		50		2.1
	CL-CLAY (FILL), with silt and sand, trace gravel, fine sand, fine to coarse gravel, low plasticity, firm, black, moist, slight oil-like odor							
10	SP-SAND (FILL), trace brick and glass debris, fine grained, loose to compact, brown, moist	10.25						1.2
12	- with silt, no brick or glass debris, compact, wet at 5.0ft BGS			4GP		50		1.2
14	- with bottom ash, slag, coal, brick, glass and rubber debris, trace silt, black at 6.0ft BGS							
	- oil-like odor at 9.5ft BGS							
16	CL-SILTY CLAY, low plasticity, firm to stiff, brown, moist, mottled, trace staining							1.7
18	- no staining at 12.0ft BGS			5GP		30		1.2
20	END OF BOREHOLE @ 20.0ft BGS	20.00						
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

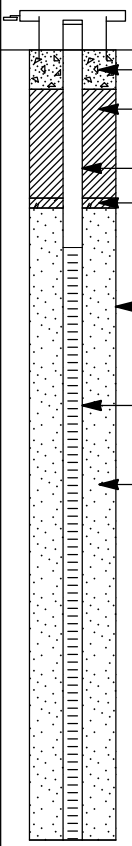
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-8

DATE COMPLETED: August 28, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
			CONCRETE	1SH		100		-
			BENTONITE GROUT					
			4" PVC WELL CASING	2GP		85		0.1
			BENTONITE CHIPS					0.9
			10" BOREHOLE					0.4
			4" PVC WELL SCREEN	3GP		25		1.3
			SAND PACK					5.5
				4GP		25		9.2
								-
				5GP		0		-
								-
								-
				6GP		0		-
								-
								-
				7GP		0		-
								-
								-
				8GP		0		-
								-

WELL DETAILS

Screened interval:
5.00 to 20.00ft BGS

Length: 15ft
Diameter: 4in
Slot Size: 0.010
Material: WIRE WRAPPED PVC

Seal:
3.75 to 4.00ft BGS
Material: BENTONITE CHIPS

Sand Pack:
4.00 to 20.00ft BGS
Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-8
DATE COMPLETED: August 28, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
36								
38				9GP		0		-
40								-
42	CL-CLAY, trace silt, sand and gravel, fine sand, fine to coarse gravel, low plasticity, stiff, gray, moist	41.00		10GP		70		1.0
44								0.7
46	END OF BOREHOLE @ 46.0ft BGS	46.00						
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

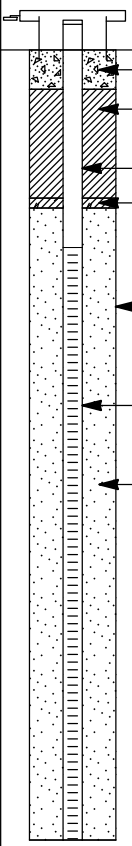
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-9

DATE COMPLETED: August 28, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25	CONCRETE	1SH		100		-
	GEOMEMBRANE/LINER	1.30	BENTONITE GROUT					
2	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist		4" PVC WELL CASING					0.0
4	- silty clay, trace sand, slightly mottled at 3.3ft BGS		BENTONITE CHIPS	2GP		100		0.2
6	- sandy clay, not mottled at 3.8ft BGS							
	- silty clay, gray at 4.8ft BGS	6.00	10" BOREHOLE					31.1
8	SP-SAND (FILL), with silt, fine grained, compact, dark brown, moist, staining, slight petroleum-like odor		4" PVC WELL SCREEN	3GP		60		187.2
10	- with bottom ash, slag, concrete, glass and wood, trace brick debris, loose to compact at 7.0ft BGS		SAND PACK					
12	- wet, strong odor, trace free product at 8.3ft BGS							88.1
14				4GP		40		84.2
16								40.2
18								
20				5GP		35		125.7
22	CL-CLAY, trace silt, low plasticity, firm, brown, moist	21.00						0.8
24	- firm to soft at 23.0ft BGS			6GP		65		0.4
26	END OF BOREHOLE @ 26.0ft BGS	26.00						
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

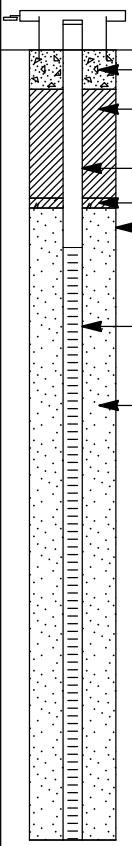
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-10

DATE COMPLETED: August 28, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
			CONCRETE	1SH		100		-
			BENTONITE GROUT					
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25						
	GEOMEMBRANE/LINER	1.30						
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist	1.75						0.1
4	SP-SAND (FILL), trace rootlets and gravel, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist	2.00		2GP		100		0.2
6	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist	6.00						
8	- with silt at 2.8ft BGS							
	- silty clay, trace sand, gray at 4.8ft BGS							
10	SP-SAND (FILL), with bottom ash and slag, fine grained, loose, black, wet, slight oil-like odor	9.00		3GP		80		14.2
	- trace debris, compact at 8.3ft BGS							
12	CONCRETE	11.00						
14	SP-SAND (FILL), with bottom ash and slag, trace brick and metal debris, fine grained, loose, black, wet, slight oil-like odor			4GP		50		95.7
	- trace neon green sand at 12.0ft BGS							
	- no neon green sand at 12.3ft BGS							87.3
16								
18				5GP		30		4.3
20								
22	CL-SILTY CLAY, low plasticity, firm to stiff, brown, moist	20.75						
	- soft at 23.0ft BGS			6GP		30		1.0
24								
26	END OF BOREHOLE @ 26.0ft BGS	26.00						0.4
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-11

PROJECT NUMBER: 048041

DATE COMPLETED: August 29, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.50		1SH		100		-
	GEOMEMBRANE/LINER	1.55						0.2
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist - with silt, slightly mottled at 2.5ft BGS - silty clay, trace sand, gray, not mottled at 4.0ft BGS	4.75		2GP		100		5.4
6	SP-SAND (FILL), with gravel, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist - trace staining at 5.0ft BGS - 2" concrete debris at 5.2ft BGS	6.50						25.1
8	SC-CLAYEY SAND (FILL), with gravel, bottom ash and concrete, fine sand, fine to coarse gravel, compact, dark gray, wet, oil-like odor - 4" silty clay, soft to firm, brown, moist at 11.0ft BGS - 2" brick debris, trace free product at 11.4ft BGS	11.60		3GP		80		33.3
10								72.8
12	SP-SAND (FILL), with bottom ash and slag, trace brick and glass debris, fine grained, loose to compact, black, wet, petroleum-like odor, staining - with wood debris at 18.0ft BGS	25.50		4GP		60		18.0
14								58.7
16				5GP		60		20.2
18								3.8
20				6GP		40		1.6
22								
24								
26	CL-SILTY CLAY, trace fine sand, low plasticity, firm to sift, brown, moist	26.50						
28	END OF BOREHOLE @ 26.5ft BGS	26.50	<p>WELL DETAILS Screened interval: 6.00 to 26.00ft BGS Length: 20ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 26.00ft BGS Material: SAND</p>					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-12

PROJECT NUMBER: 048041

DATE COMPLETED: August 27, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
			<p>CONCRETE</p> <p>BENTONITE GROUT</p> <p>4" PVC WELL CASING</p> <p>BENTONITE CHIPS</p> <p>10" BOREHOLE</p> <p>4" PVC WELL SCREEN</p> <p>SAND PACK</p>					
			<p><u>WELL DETAILS</u></p> <p>Screened interval: 5.00 to 20.00ft BGS</p> <p>Length: 15ft</p> <p>Diameter: 4in</p> <p>Slot Size: 0.010</p> <p>Material: WIRE WRAPPED PVC</p> <p>Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS</p> <p>Sand Pack: 4.00 to 20.00ft BGS Material: SAND</p>					
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.15		1SH		100		-
	GEOMEMBRANE/LINER	1.20						0.2
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		16.8
	- with silt, trace sand, mottled at 2.0ft BGS	4.50						
	- sandy clay, trace silt, not mottled at 3.5ft BGS	5.20						
	- silty clay, trace sand, gray at 4.3ft BGS							
6	CONCRETE			3GP		60		33.2
8	SM-SILTY SAND (FILL), with concrete, fine grained, compact, black, moist, petroleum-like odor, staining							150.8
	- no concrete, wet at 5.5ft BGS	10.00						
	- dark gray at 6.0ft BGS	10.50						
	- with clay at 9.5ft BGS							
	BRICK DEBRIS			4GP		55		135.4
12	SP-SAND (FILL), with bottom ash and concrete, trace brick debris, fine grained, loose to compact, black, wet, petroleum-like odor, sheen							31.2
14								82.2
16				5GP		50		34.7
18								0.8
20		20.50						0.4
22	CL-CLAY, trace silt and fine sand, low plasticity, firm to stiff, brown, moist			6GP		65		
24								
26	- soft at 25.0ft BGS	25.50						
28	END OF BOREHOLE @ 25.5ft BGS							
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12

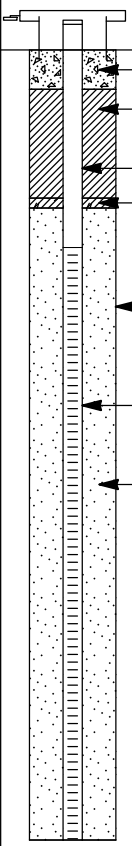


STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-14
DATE COMPLETED: August 17, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25	 <p>CONCRETE</p> <p>BENTONITE GROUT</p> <p>4" PVC WELL CASING</p> <p>BENTONITE CHIPS</p> <p>10" BOREHOLE</p> <p>4" PVC WELL SCREEN</p> <p>SAND PACK</p>	1SH		100		-
2	GEOMEMBRANE/LINER	1.30						0.3
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		0.2
4	- gray at 5.0ft BGS							
6	SP-SAND (FILL), with gravel, trace brick and slag, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist	5.30						0.2
8	- trace gravel, no slag or brick, light brown at 6.0ft BGS			3GP		80		12.5
	- with gravel, trace slag and brick, brown at 6.5ft BGS							
10	- with bottom ash, slag, brick and clay, no gravel, black, slight oil-like odor at 6.8ft BGS							12.1
12	- with coal, wood and glass at 7.0ft BGS			4GP		30		9.7
14	- loose to compact, wet, sheen at 10.0ft BGS							
16	- increase in sand at 15.5ft BGS			5GP		25		4.1
18								
20								4.1
22	CL-SILTY CLAY, low plasticity, firm, brown, moist	22.00		6GP		45		0.3
24								0.2
26	END OF BOREHOLE @ 25.0ft BGS	25.00						
28								
30								
32								
34								

WELL DETAILS

Screened interval:

5.00 to 20.00ft BGS

Length: 15ft

Diameter: 4in

Slot Size: 0.010

Material: WIRE WRAPPED PVC

Seal:

3.75 to 4.00ft BGS

Material: BENTONITE CHIPS

Sand Pack:

4.00 to 20.00ft BGS

Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-15

PROJECT NUMBER: 048041

DATE COMPLETED: August 20, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-16

PROJECT NUMBER: 048041

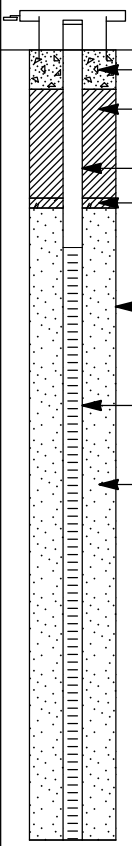
DATE COMPLETED: August 28, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25	CONCRETE	1SH		100		-
2	GEOMEMBRANE/LINER	1.30	BENTONITE GROUT					
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist		4" PVC WELL CASING	2GP		100		0.0
4	- silty clay, trace sand and gravel, mottled at 2.5ft BGS		BENTONITE CHIPS					0.0
6	- sandy clay, not mottled at 3.0ft BGS	6.00	10" BOREHOLE					33.8
8	- silty clay, gray at 4.9ft BGS		4" PVC WELL SCREEN	3GP		60		147.5
10	SP-SAND (FILL), with bottom ash, slag, wood, trace glass, metal and brick debris, fine grained, loose to compact, black, moist, staining, petroleum-like odor		SAND PACK					61.0
12	- increase in wood debris at 10.5ft BGS			4GP		30		28.5
14	- wet at 11.0ft BGS							
16								
18				5GP		10		14.2
20								
22	CL-CLAY, trace silt, low plasticity, soft to firm, brown, moist	21.00		6GP		70		4.2
24								0.7
26	END OF BOREHOLE @ 26.0ft BGS	26.00						
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-17

DATE COMPLETED: August 29, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
				1SH		100		-
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25	CONCRETE					
	GEOMEMBRANE/LINER	1.30	BENTONITE GROUT					0.4
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist, slightly mottled	3.75	4" PVC WELL CASING	2GP		100		17.5
	- with silt at 2.3ft BGS		BENTONITE CHIPS					
6	- trace concrete debris at 2.5ft BGS		10" BOREHOLE					40.3
8	- silty clay, trace sand, gray, not mottled at 3.5ft BGS		4" PVC WELL SCREEN	3GP		50		31.5
10	SP-SAND (FILL), with concrete and gravel, trace brick and glass debris, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist		SAND PACK					67.1
12	- with clay, staining, slight oil-like odor at 4.2ft BGS							92.8
14	- wet at 5.5ft BGS			4GP		55		116.1
16	- trace gravel and debris at 6.0ft BGS							212.5
18	- with silt, brown at 10.5ft BGS			5GP		45		122.8
20	- 3" silty clay, firm, brown, moist at 12.0ft BGS							22.3
22	- 2" brick debris at 12.3ft BGS			6GP		5		3.6
24	- with bottom ash, trace wood debris at 12.5ft BGS							0.9
26	CL-SILTY CLAY, trace fine sand and fine gravel, low plasticity, soft, gray, moist	25.50		7GP		60		
28								
30		30.50						
32								
34	END OF BOREHOLE @ 35.0ft BGS							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-18

DATE COMPLETED: August 29, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
				1SH		100		-
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00						
	GEOMEMBRANE/LINER	1.05						0.2
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		
	- trace concrete debris at 2.5ft BGS							30.4
	- silty clay, trace sand, mottled at 3.0ft BGS	4.75						
	- gray, not mottled at 3.5ft BGS							
6	SP-SAND (FILL), trace clay and gravel, fine sand, fine to coarse gravel, poorly graded, compact, dark brown, moist, slight oil-like odor	6.00						32.7
8	- 3\"/>			3GP		75		
	- black, trace staining at 5.3ft BGS							50.0
10	CL-SANDY CLAY (FILL), trace gravel, fine sand, fine to coarse gravel, low plasticity, firm, black, moist, staining, oil-like odor	10.00						
12	- silty clay, trace sand, no gravel, stiff, slightly mottled at 8.0ft BGS							
14	SP-SAND (FILL), with clay, bottom ash, slag, brick and concrete debris, fine grained, loose to compact, black, wet, staining, slight oil-like odor			4GP		10		36.6
16								28.2
18				5GP		50		
20								50.8
22	CL-SILTY CLAY, trace fine sand, low plasticity, stiff, brown, moist	20.25						2.2
	- firm to soft at 23.0ft BGS			6GP		70		
24	- soft at 24.0ft BGS							1.0
26	END OF BOREHOLE @ 25.5ft BGS	25.50						
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

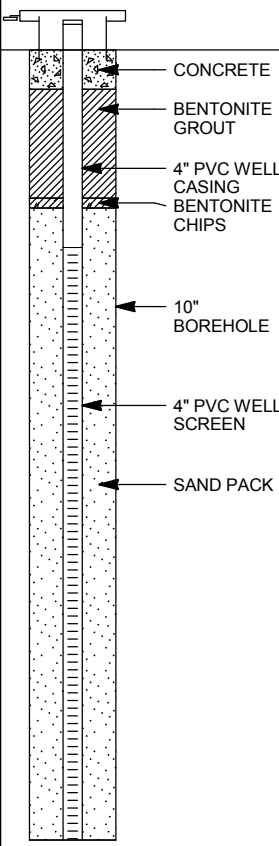


STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-22
DATE COMPLETED: August 21, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00		1SH		100		-
2	GEOMEMBRANE/LINER	1.05						
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		0.4
4	- with silt, trace concrete debris at 2.3ft BGS							0.2
4	- mottled at 2.5ft BGS							
4	- with concrete debris at 4.5ft BGS							
6	- gray at 5.5ft BGS							
8	SP-SAND (FILL), with clay, trace concrete and gravel, fine sand, fine to coarse gravel, compact, brown, moist, slight petroleum-like odor	7.00		3GP		75		35.7
10	- trace glass debris at 7.8ft BGS							131.1
10	- with bottom ash, slag, brick, concrete, wood, trace metal and rubber debris, wet, strong petroleum-like odor at 8.5ft BGS							
12	- loose to compact at 11.0ft BGS			4GP		25		83.7
14								114.4
16								
18				5GP		5		32.8
20								19.1
22	CL-CLAY, trace silt, low plasticity, firm to soft, brown, moist	21.00	<p><u>WELL DETAILS</u> Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND</p>	6GP		40		4.9
24								
26	END OF BOREHOLE @ 26.0ft BGS	26.00						2.0
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-23

DATE COMPLETED: August 28, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
				1SH		100		-
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00						
	GEOMEMBRANE/LINER	1.05						0.6
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		0.4
	- trace concrete debris at 2.2ft BGS							
	- silty clay, trace sand, mottled at 2.5ft BGS							
	- gray, not mottled at 4.5ft BGS	5.50						
6	SP-SAND (FILL), with clay, trace concrete and slag, fine sand, fine to coarse gravel, poorly graded, compact, black, moist, staining, petroleum-like odor	7.25						140.1
8	- loose to compact, wet at 6.8ft BGS	8.50		3GP		75		118.7
	CONCRETE DEBRIS	9.00						
10	BRICK DEBRIS							
12	SP-SAND (FILL), with clay, bottom ash and slag, trace brick and concrete debris, loose, fine sand, fine to coarse gravel, poorly graded, loose, black, wet, strong petroleum-like odor			4GP		60		150.2
14								98.8
16								79.9
18				5GP		30		128.2
20								
22	CL-SILTY CLAY, low plasticity, firm to stiff, brown, moist	20.50		6GP		70		11.0
24	- with silt, trace fine sand, soft to firm at 24.0ft BGS							1.0
26	END OF BOREHOLE @ 25.5ft BGS	25.50						
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-24

PROJECT NUMBER: 048041

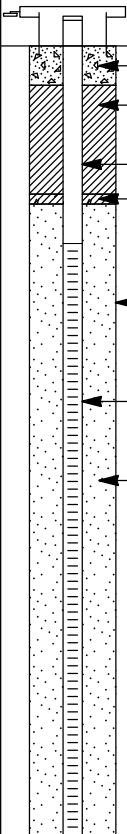
DATE COMPLETED: August 24, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.25	CONCRETE	1SH		100		-
2	GEOMEMBRANE/LINER	1.30	BENTONITE GROUT					0.2
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist - with silt at 2.0ft BGS	4.25	4" PVC WELL CASING BENTONITE CHIPS	2GP		100		7.0
6	- silty clay, with sand, gray at 3.5ft BGS	5.00						
8	SP-SAND (FILL), with gravel, trace slag and concrete, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist, staining, slight oil-like odor	5.75						
10	GP-GRAVEL (FILL), with sand, trace concrete, fine to coarse gravel, fine sand, poorly graded, compact, brown, moist, staining	6.50	10" BOREHOLE	3GP		65		7.9
12	CL-SILTY CLAY (FILL), trace sand and gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, olive green, mottled, moist		4" PVC WELL SCREEN					323.7
14	SP-SAND (FILL), with clay, trace bottom ash, brick and glass debris, fine grained, compact, dark brown, moist, staining, strong petroleum-like odor		SAND PACK					
16	- wet, black, trace free product at 6.75ft BGS			4GP		10		150.2
18	- with bottom ash, slag and glass debris, loose to compact at 10.5ft BGS							
20				5GP		10		22.7
22	CL-SILTY CLAY, trace fine sand, low plasticity, firm to stiff, brown, moist	21.00						
24	- soft at 24.5ft BGS			6GP		30		10.2
26	END OF BOREHOLE @ 25.5ft BGS	25.50						1.4
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12

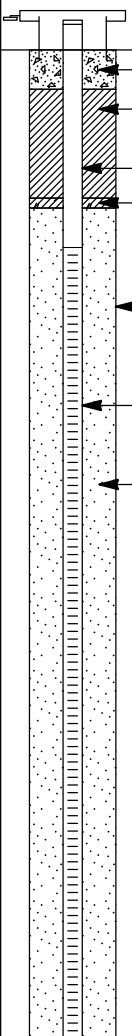


STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-25
DATE COMPLETED: August 16, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00	 <p>CONCRETE BENTONITE GROUT 4" PVC WELL CASING BENTONITE CHIPS 10" BOREHOLE 4" PVC WELL SCREEN SAND PACK</p>	1SH		100		-
	GEOMEMBRANE/LINER	1.05						0.0
4	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		0.1
	- trace concrete at 3.0ft BGS							
	- 1.5" concrete debris at 5.0ft BGS							
6	SP-SAND (FILL), with gravel, fine to medium sand, fine to coarse gravel, poorly graded, loose to compact, brown, moist	5.20						6.1
		5.45						
8	CL-SANDY CLAY (FILL), trace gravel, wood, coal, bottom ash, slag and brick debris, fine to medium sand, fine to coarse gravel, low plasticity, firm, black, moist, slight oil-like odor			3GP		80		1.4
10	SM-SILTY SAND (FILL), with bottom ash, slag, glass, brick, concrete and paper debris, fine grained, compact, black, wet, staining, oil-like odor	9.00						13.0
12				4GP		50		43.6
14	- loose to compact, sheen at 14.5ft BGS							
16	- with clay, no sheen at 15.0ft BGS							2.6
18				5GP		30		1.4
20	- increase in glass debris at 20.0ft BGS							6.1
22				6GP		30		0.6
24	CL-SILTY CLAY (FILL), low plasticity, stiff, brown, moist	24.00	<p><u>WELL DETAILS</u> Screened interval: 5.00 to 25.00ft BGS Length: 20ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 25.00ft BGS Material: SAND</p>					
26	- 2" slag at 24.5ft BGS	25.00						
	END OF BOREHOLE @ 25.0ft BGS							
28								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-26

PROJECT NUMBER: 048041

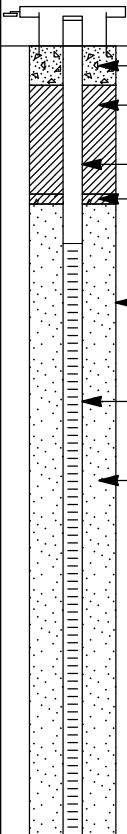
DATE COMPLETED: August 20, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00	CONCRETE	1SH		100		-
2	GEOMEMBRANE/LINER	1.05	BENTONITE GROUT					0.0
4	CL-SANDY CLAY (FILL), trace silt and gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist - silty clay, trace sand and concrete debris, slightly mottled at 2.7ft BGS - sandy clay, with gravel, trace silt, not mottled at 3.3ft BGS	5.50	4" PVC WELL CASING BENTONITE CHIPS	2GP		100		0.0
6	SP-SAND (FILL), with clay and gravel, trace coal, brick and concrete debris, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist - with concrete debris at 6.5ft BGS - with silt, bottom ash and slag, trace glass and brick debris, no clay, black, staining, petroleum-like odor at 7.0ft BGS - wet, stong odor, sheen, trace free product at 11.0ft BGS		10" BOREHOLE					19.4
8			4" PVC WELL SCREEN	3GP		50		122.5
10			SAND PACK					202.5
12				4GP		25		103.1
14								56.5
16	- increase in glass debris at 16.0ft BGS							7.9
18				5GP		30		1.0
20								0.2
22	ML-SILT, with clay, trace fine sand, low plasticity, firm, brown, wet, staining, slight petroleum-like odor	21.00	<u>WELL DETAILS</u> Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND					
24	CL-CLAY, trace silt, low plasticity, stiff, brown, moist	22.25		6GP		85		
26	- firm at 25.5ft BGS							
28	END OF BOREHOLE @ 26.0ft BGS	26.00						
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

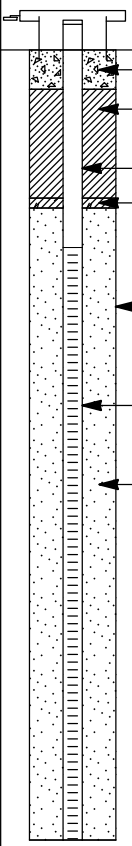
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: EX-27

DATE COMPLETED: August 20, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	GP-GRAVEL (FILL), fine grained, poorly graded, compact, gray, moist	1.00		1SH		100		-
2	GEOMEMBRANE/LINER	1.05						
4	CL-SANDY CLAY (FILL), trace silt and gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist			2GP		100		0.2
4	- trace concrete debris at 1.8ft BGS							0.1
4	- with silt at 2.0ft BGS							
4	- slightly mottled at 4.9ft BGS							
6	- gray at 5.5ft BGS	6.00						
8	SP-SAND (FILL), with clay, trace bottom ash, slag, brick, concrete and glass debris, fine grained, compact, dark brown, moist, staining, slight petroleum-like odor	8.00		3GP		70		23.7
8	CONCRETE	8.50						61.6
10	SP-SAND (FILL), with bottom ash, slag, brick, wood, concrete and glass debris, fine grained, compact, black, wet, staining, slight petroleum-like odor							
12				4GP		0		-
14								-
16	- REFUSAL at 16.0ft BGS	16.00						
16	END OF BOREHOLE @ 16.0ft BGS							
18								
20								
22								
24								
26								
28								
30								
32								
34								

WELL DETAILS
Screened interval:
5.00 to 20.00ft BGS
Length: 15ft
Diameter: 4in
Slot Size: 0.010
Material: WIRE WRAPPED PVC
Seal:
3.75 to 4.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
4.00 to 20.00ft BGS
Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-30

PROJECT NUMBER: 048041

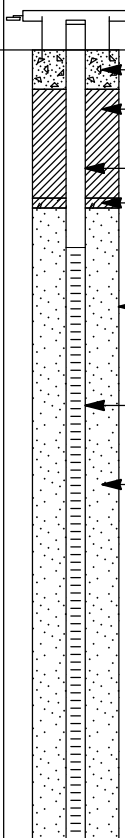
DATE COMPLETED: August 24, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
								
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist	1.00	CONCRETE	1SH		100		--
2	GEOMEMBRANE/LINER	1.05	BENTONITE GROUT					0.4
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist	3.75	4" PVC WELL CASING	2GP		100		0.2
4	SP-SAND (FILL), trace gravel, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist	4.00	BENTONITE CHIPS					
6	CONCRETE	4.50						
	SP-SAND (FILL), with bottom ash, slag, coal and concrete debris, fine grained, compact, black, moist		10" BOREHOLE					1.8
8	- with silt, trace wood and debris, staining at 5.8ft BGS		4" PVC WELL SCREEN	3GP		70		2.0
10	- 6" bottom ash at 10.5ft BGS							
12	- silty sand, trace bottom ash, no slag or concrete, loose to compact, brown, wet at 11.0ft BGS		SAND PACK					0.6
14				4GP		50		0.0
16	CL-SILTY CLAY, low plasticity, firm to soft, brown, moist	16.00						0.0
18				5GP		30		0.0
20								0.0
22	END OF BOREHOLE @ 21.0ft BGS	21.00	WELL DETAILS Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-32

PROJECT NUMBER: 048041

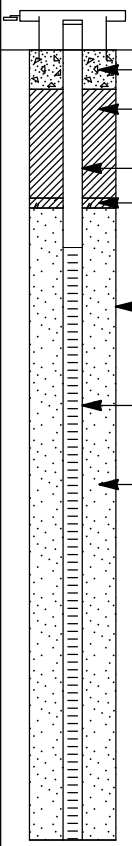
DATE COMPLETED: August 22, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	SC-CLAYEY SAND (FILL), with gravel, fine to medium sand, fine to coarse gravel, poorly graded, compact, brown, moist	0.75		1GP	80			0.2
4	CL-CLAY (FILL), with silt and sand, trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, soft, brown, moist - stiff at 1.3ft BGS - trace concrete debris at 2.0ft BGS - gray at 4.5ft BGS - soft, brown, wet at 5.0ft BGS							0.2
6	CONCRETE	6.50		2GP	75			1.0
8	SP-SAND (FILL), with clay, trace gravel, fine sand, fine to coarse gravel, poorly graded, compact, black, moist - 2" concrete debris at 7.5ft BGS - with bottom ash, slag, wood, glass and rubber debris, loose to compact, staining, strong petroleum-like odor, staining at 8.0ft BGS - wet, sheen, trace free product at 8.8ft BGS - with brick debris at 10.0ft BGS	7.00						349.8
10				3GP	40			253.2
12								161.9
14				4GP	30			83.2
16								6.3
18				5GP	75			12.9
20								2.2
22	CL-SILTY CLAY, low plasticity, firm, brown, moist	20.50	<p>WELL DETAILS Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND</p>					
24	- soft at 24.0ft BGS							
26	END OF BOREHOLE @ 25.0ft BGS	25.00						
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-33

PROJECT NUMBER: 048041

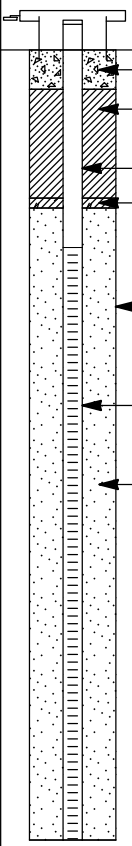
DATE COMPLETED: August 23, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.25		1GP		90		0.3
2	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist							
4	- stiff at 2.0ft BGS - 3" concrete debris at 2.3ft BGS - very stiff, mottled at 2.5ft BGS - gray at 3.0ft BGS							2.6
6	SC-CLAYEY SAND (FILL), fine grained, compact, dark red, moist, staining, petroleum-like odor	5.00						137.3
8	BRICK	7.00		2GP		60		194.4
	SP-SAND (FILL), with silt, fine grained, compact, black, wet, staining, petroleum-like odor, free product on liner	7.65						
10	- with bottom ash, slag, glass and concrete debris, loose to compact at 10.0ft BGS							108.1
12				3GP		50		66.7
14								
16				4GP		65		4.6
18								3.0
20	CL-SILTY CLAY, with fine sand, low plasticity, firm, gray, moist, trace staining	20.00	<p><u>WELL DETAILS</u> Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND</p>	5GP		50		3.3
22	- no sand, no staining at 20.5ft BGS - soft to firm at 21.0ft BGS							
24								2.2
26	END OF BOREHOLE @ 25.0ft BGS	25.00						
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-34

PROJECT NUMBER: 048041

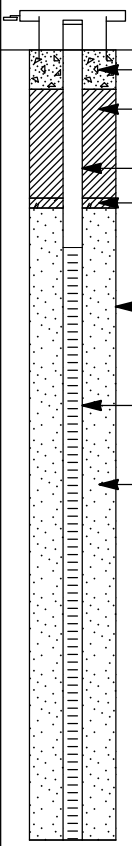
DATE COMPLETED: August 21, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.15 0.50						
2	CL-SANDY CLAY (FILL), with silt, trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist		CONCRETE	1GP	60			0.0
4	SP-SAND (FILL), with gravel, bottom ash, concrete and slag, trace glass debris, fine sand, fine to coarse gravel, poorly graded, loose to compact, brown, moist		BENTONITE GROUT					0.1
6	- trace gravel, black at 4.0ft BGS		4" PVC WELL CASING					0.2
8	- increase in debris at 5.0ft BGS		BENTONITE CHIPS	2GP	30			0.4
10			10" BOREHOLE					0.0
12	- 4" concrete debris at 11.0ft BGS		4" PVC WELL SCREEN	3GP	50			0.1
14			SAND PACK					0.0
16				4GP	60			0.0
18	- no debris, compact at 17.5ft BGS							0.0
20	- with bottom ash and slag at 18.9ft BGS	19.50 20.00						0.0
22	CL-SILTY CLAY, moderate plasticity, firm, brown, moist							
24	END OF BOREHOLE @ 20.0ft BGS							
26								
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-35

PROJECT NUMBER: 048041

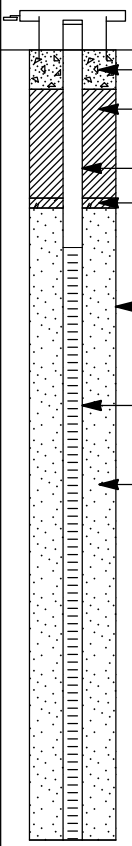
DATE COMPLETED: August 22, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.20		1GP	70			0.2
2	CL-CLAY (FILL), with silt and sand, trace gravel, fine sand, fine to coarse gravel, low plasticity, firm, brown, moist, slightly mottled	1.65						
4	SP-SAND (FILL), with gravel, trace brick and concrete debris, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist - 4" concrete debris at 2.0ft BGS - petroleum-like odor, staining at 2.5ft BGS - with clay, loose to compact, wet, strong petroleum-like odor, trace free product at 5.0ft BGS			2GP	30			218.2
6								257.1
8				3GP	25			293.8
10	- no free product, slight petroleum-like odor at 10.0ft BGS							154.7
12				4GP	60			61.8
14								35.8
16	- trace gravel and debris, compact at 15.0ft BGS							1.4
18								
20	CL-SILTY CLAY, moderate plasticity, firm, brown, moist END OF BOREHOLE @ 20.0ft BGS	19.00 20.00						
22			WELL DETAILS Screened interval: 5.00 to 20.00ft BGS Length: 15ft Diameter: 4in Slot Size: 0.010 Material: WIRE WRAPPED PVC Seal: 3.75 to 4.00ft BGS Material: BENTONITE CHIPS Sand Pack: 4.00 to 20.00ft BGS Material: SAND					
24								
26								
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: EX-36

PROJECT NUMBER: 048041

DATE COMPLETED: August 22, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
0.50 1.00 1.50	CL-CLAY (FILL), with silt and sand, trace gravel, fine sand, fine to coarse gravel, moderate plasticity, firm, brown, moist		CONCRETE	1SH	80	80		27.1
2	SP-SAND (FILL), with gravel, trace clay, fine sand, fine to coarse gravel, poorly graded, loose to compact, brown, moist		BENTONITE GROUT					89.2
4	CONCRETE		4" PVC WELL CASING BENTONITE CHIPS	2GP	10	10		161.8
6	SP-SAND (FILL), with gravel, fine sand, fine to coarse gravel, poorly graded, compact, black, moist, oil-like odor		10" BOREHOLE					
8	- 2" brick debris at 2.3ft BGS		4" PVC WELL SCREEN	3GP	10	10		105.1
10	- trace brick debris, no gravel, dark red at 2.4ft BGS		SAND PACK					
12	- 2" silty clay lens at 3.5ft BGS			4GP	60	60		86.9
14	- with bottom ash and slag, trace glass, black, staining, strong petroleum-like odor at 4.5ft BGS							
16	- wet at 5.0ft BGS							
18		18.50						
20	CL-SILTY CLAY, low plasticity, firm to stiff, gray, moist	20.00						4.0
22	END OF BOREHOLE @ 20.0ft BGS							
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
Screened interval:
5.00 to 20.00ft BGS
Length: 15ft
Diameter: 4in
Slot Size: 0.01
Material: WIRE WRAPPED PVC
Seal:
3.75 to 4.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
4.00 to 20.00ft BGS
Material: SAND

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: MW11-12

PROJECT NUMBER: 048041

DATE COMPLETED: September 5, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
0.50	SP/GP-SAND AND GRAVEL (FILL), fine to medium sand, fine to coarse gravel, poorly graded, compact, brown, moist	0.50	CONCRETE	1GP		100		0.0
1.50	SP-SAND (FILL), with gravel, trace concrete, brick and slag, fine to medium sand, fine to coarse gravel, poorly graded, compact, brown, moist	1.50	BENTONITE GROUT					0.0
1.80	- black at 1.3ft BGS	1.80	2" PVC WELL CASING					0.0
2.00	BRICK DEBRIS		BENTONITE CHIPS	2GP		75		0.0
4.00			4-1/4" BOREHOLE					0.0
6.00	CL-SANDY CLAY (FILL), fine to medium grained, low plasticity, firm, dark brown, moist		2" PVC WELL SCREEN					0.0
8.00	- with silt and sand, fine grained, brown, mottled at 2.4ft BGS		SAND PACK	3GP		50		0.0
10.00	- soft to firm at 5.0ft BGS							0.0
12.00	- silty clay, trace sand at 5.3ft BGS							0.0
14.00	- 4" clayey silt seam, wet at 7.0ft BGS	10.00						0.0
16.00	CL-CLAY, with silt, low plasticity, soft, gray, moist to very moist	15.00						0.0
18.00	END OF BOREHOLE @ 15.0ft BGS							0.0
20.00								
22.00								
24.00								
26.00								
28.00								
30.00								
32.00								
34.00								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: MW13-12

PROJECT NUMBER: 048041

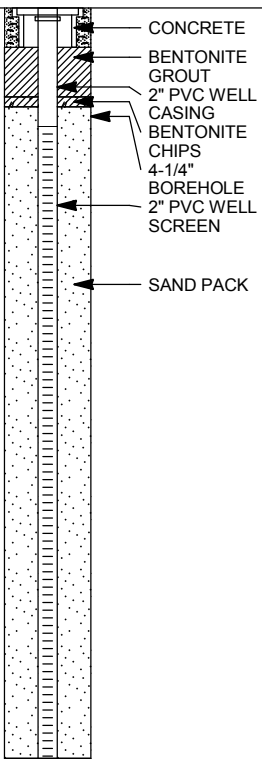
DATE COMPLETED: September 6, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	SP/GP-SAND AND GRAVEL (FILL), fine sand, coarse gravel, poorly graded, compact, brown, moist	0.50	 <p>CONCRETE BENTONITE GROUT 2" PVC WELL CASING BENTONITE CHIPS 4-1/4" BOREHOLE 2" PVC WELL SCREEN SAND PACK</p>	1GP	100			11.8
	WOOD DEBRIS	0.65						
	BRICK DEBRIS	0.90						
4	SP-SAND (FILL), with gravel, trace wood and brick debris, fine to medium sand, fine to coarse gravel, poorly graded, compact, dark brown, moist	1.50						5.2
6	CONCRETE DEBRIS	2.00						
		2.25						
8	SP-SAND (FILL), with gravel, clay and brick debris, fine to medium sand, fine to coarse gravel, poorly graded, compact, dark brown, moist	5.00		2GP	65			2.9
		7.00						
		7.75						7.0
10	CL-SANDY CLAY (FILL), trace silt and gravel, fine sand, fine to coarse gravel, low plasticity, firm, dark gray, moist, staining							14.1
12	SP-SAND (FILL), with clay, trace bottom ash, wood and concrete debris, fine grained, compact, dark gray, wet			3GP	20			0.6
14	CL-SANDY CLAY (FILL), fine grained, low plasticity, soft, dark gray, wet							
16	SP-SAND (FILL), with clay, trace glass, bottom ash, wood and concrete debris, fine grained, compact, dark gray, wet							0.9
18				4GP	35			0.8
		18.50						
		20.00						0.3
20	CL-CLAY, with silt, moderate plasticity, soft to firm, gray, moist		<p><u>WELL DETAILS</u> Screened interval: 3.00 to 19.00ft BGS Length: 16ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 2.25 to 2.50ft BGS Material: BENTONITE CHIPS Sand Pack: 2.50 to 19.00ft BGS Material: SAND</p>					
22	END OF BOREHOLE @ 20.0ft BGS							
24								
26								
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: MW14-12

PROJECT NUMBER: 048041

DATE COMPLETED: September 4, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
0.65	SP/GP-SAND AND GRAVEL (FILL), fine sand, fine to coarse gravel, poorly graded, compact, brown, moist	0.65	CONCRETE	1GP	65			0.5
1.20		1.20	BENTONITE GROUT					
1.75	GP-GRAVEL (FILL), coarse grained, compact, brown, moist	1.75	2" PVC WELL CASING					1.2
4.50	SP-SAND (FILL), with bottom ash, trace glass, brick and coal debris, fine grained, compact, brown, moist	4.50	BENTONITE CHIPS	2GP	75			20.0
4.85		4.85	4-1/4" BOREHOLE					
7.00	CL-SANDY CLAY (FILL), trace coal and gravel, fine sand, fine to coarse gravel, low plasticity, stiff, dark gray to black, moist - with silt, fine to coarse sand, firm, mottled at 4.0ft BGS	7.00	2" PVC WELL SCREEN					2.4
	SC-CLAYEY SAND (FILL), fine grained, compact, dark brown, moist to very moist		SAND PACK	3GP	40			4.0
	CL-CLAY (FILL), with silt, sand and brick debris, fine to medium grained, low plasticity, stiff, brown, moist							0.3
	- 1.5" wood debris at 6.0ft BGS							0.6
	- 6" brick debris at 6.3ft BGS			4GP	40			0.2
	SP-SAND (FILL), with bottom ash, wood, glass and brick debris, fine grained, compact, dark brown, moist							0.1
	- wet at 7.5ft BGS							0.2
	- increase in glass debris, loose to compact at 10.0ft BGS							
18.00	CL-SILTY CLAY, low plasticity, stiff, brown, moist	18.00						
20.00	END OF BOREHOLE @ 20.0ft BGS	20.00						

WELL DETAILS

Screened interval:
3.00 to 19.00ft BGS

Length: 16ft

Diameter: 2in

Slot Size: 0.010

Material: PVC

Seal:

2.25 to 2.50ft BGS

Material: BENTONITE CHIPS

Sand Pack:

2.50 to 19.00ft BGS

Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

PROJECT NUMBER: 048041

CLIENT: PRP GROUP

LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: MW15-12

DATE COMPLETED: September 4, 2012

DRILLING METHOD: GEOPROBE

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
		0.30 0.50	CONCRETE					1.8
2	GP-GRAVEL (FILL), coarse grained, compact, brown, moist		BENTONITE GROUT	1GP		90		4.6
	CONCRETE		2" PVC WELL CASING					1.1
4	CL-SANDY CLAY (FILL), trace gravel, wood, brick, slag and coal debris, fine to medium sand, fine to coarse gravel, low plasticity, stiff, dark brown, moist, mottled	3.25	BENTONITE CHIPS					0.1
	- with silt, olive green, staining at 2.3ft BGS	4.50	4-1/4" BOREHOLE	2GP		75		0.1
6	SP-SAND (FILL), with silt, fine grained, compact, black, moist, slight oil-like odor		2" PVC WELL SCREEN					0.1
	- gray, very moist, trace staining at 3.5ft BGS		SAND PACK	3GP		60		0.1
	- no odor at 4.0ft BGS							0.1
8	CL-SILTY CLAY (FILL), with sand, trace gravel, fine to coarse sand, fine to coarse gravel, low plasticity, stiff, olive green, moist, mottled	9.50		4GP		45		0.1
	- 2" brick debris at 4.8ft BGS							0.1
	- 2" concrete debris at 8.5ft BGS							0.1
12	SP-SAND (FILL), with bottom ash, trace wood and paper, fine grained, compact, dark brown to black, moist							0.1
	- loose to compact, wet at 10.0ft BGS							0.1
14								0.1
16								0.1
18		18.50						0.1
	CL-SILTY CLAY, trace fine sand, low plasticity, stiff, brown, moist							0.1
20	END OF BOREHOLE @ 20.0ft BGS	20.00						0.1
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS

Screened interval:

7.00 to 19.00ft BGS

Length: 12ft

Diameter: 2in

Slot Size: 0.010

Material: PVC

Seal:

4.75 to 5.00ft BGS

Material: BENTONITE CHIPS

Sand Pack:

5.00 to 19.00ft BGS

Material: SAND



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: MW16-12

PROJECT NUMBER: 048041

DATE COMPLETED: September 4, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	GP-GRAVEL (FILL), coarse grained, compact, gray, moist	0.50	CONCRETE	1GP	100	100		0.1
	CL-CLAY (FILL), with silt and sand, trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist	2.25	BENTONITE GROUT					0.1
	- 2" black staining at 2.0ft BGS		2" PVC WELL CASING BENTONITE CHIPS 4-1/4" BOREHOLE					0.1
4	CL-SILTY CLAY, trace fine sand, low plasticity, firm, gray, moist to very moist		2" PVC WELL SCREEN	2GP	80	80		0.0
6			SAND PACK					0.0
8								0.0
10				3GP	40	40		0.0
12								0.0
14								0.0
15.00	END OF BOREHOLE @ 15.0ft BGS	15.00						

WELL DETAILS
Screened interval:
4.00 to 14.00ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
2.75 to 3.00ft BGS
Material: BENTONITE CHIPS
Sand Pack:
3.00 to 14.00ft BGS
Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: GP1-12

PROJECT NUMBER: 048041

DATE COMPLETED: August 30, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	GP-GRAVEL (FILL), fine to coarse grained, poorly graded, compact, gray, moist		<p>WELL DETAILS Screened interval: 4.00 to 5.00ft BGS Length: 1ft Diameter: 0.8in Slot Size: 0.010 Material: PERFORATED PVC Seal: 2.50 to 3.50ft BGS Material: BENTONITE CHIPS Sand Pack: 3.50 to 5.00ft BGS Material: SAND</p>	1GP	60			0.1
	GEOMEMBRANE LINER	0.75 0.80						
	CL-SANDY CLAY (FILL), with silt, trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm to stiff, brown, moist, slightly mottled							
2	SP-SAND (FILL), with clay and gravel, fine to medium sand, fine to coarse gravel, poorly graded, compact, brown, moist	2.00						
	- with slag, glass and coal, trace brick at 4.0ft BGS							
4	- with wood, increase in glass at 5.0ft BGS							
	- wet at 6.3ft BGS							
6								
8								
10	END OF BOREHOLE @ 10.0ft BGS	10.00		2GP	100			0.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: GP2-12

PROJECT NUMBER: 048041

DATE COMPLETED: August 30, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.25	<p>WELL DETAILS Screened interval: 4.00 to 5.00ft BGS Length: 1ft Diameter: 0.8in Slot Size: 0.010 Material: PERFORATED PVC Seal: 2.50 to 3.50ft BGS Material: BENTONITE CHIPS Sand Pack: 3.50 to 5.00ft BGS Material: SAND</p>	1GP	70			0.0
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist	0.75						
	SP-SAND (FILL), trace clay, fine to medium grained, poorly graded, compact, dark brown, moist							
2	- trace bottom ash at 2.5ft BGS							
	- 2" bottom ash at 3.0ft BGS							
4								
	CL-SILTY CLAY (FILL), with brick debris, trace fine sand, low plasticity, firm, brown, moist	4.25						
	SP-SAND (FILL), with bottom ash, slag and glass, trace paper debris, fine grained, compact, brown, moist	5.00						
6	CL-SILTY CLAY, trace sand and gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist	5.75						
8								
10	END OF BOREHOLE @ 10.0ft BGS	10.00		2GP	95			0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: GP3-12

PROJECT NUMBER: 048041

DATE COMPLETED: August 30, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL							
	CL-SANDY CLAY (FILL), trace gravel, slag and plastic debris, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist	0.50						0.2
	SP-SAND (FILL), with silt, trace gravel, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist	1.50						
2	- with brick debris, dark brown to black at 3.0ft BGS							0.0
	CL-SILTY CLAY (FILL), with sand, trace gravel, fine to coarse sand, fine to coarse gravel, low plasticity, stiff, brown, moist	3.50						
4	- firm to stiff, mottled at 4.8ft BGS							0.1
6	- increase in silt, trace sand at 7.0ft BGS							0.0
8	CL-SILTY CLAY, trace sand, fine grained, low plasticity, firm, brown, moist	8.50						0.0
10	END OF BOREHOLE @ 10.0ft BGS	10.00						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: GP4-12
DATE COMPLETED: August 30, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.20		1GP	100			0.0
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist							
	- with silt at 1.3ft BGS							
	TOPSOIL	1.50						
2	CONCRETE AND ASPHALT DEBRIS	2.50						
	CL-CLAY (FILL), with silt, trace sand and gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist	2.75						0.0
	SP-SAND (FILL), with slag and coal, trace brick debris, fine to medium grained, poorly graded, compact, brown, moist	3.20						
4	BRICK DEBRIS	3.55						
	CL-SILTY CLAY (FILL), trace sand and gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, mottled, moist	3.80						0.0
	CL-SILTY CLAY, trace sand, fine to medium grained, low plasticity, firm, gray, moist	5.25						
6			<p>WELL DETAILS Screened interval: 4.00 to 5.00ft BGS Length: 1ft Diameter: 0.8in Slot Size: 0.010 Material: PERFORATED PVC Seal: 2.50 to 3.50ft BGS Material: BENTONITE CHIPS Sand Pack: 3.50 to 5.00ft BGS Material: SAND</p>	2GP	80			0.0
8								
10	END OF BOREHOLE @ 10.0ft BGS	10.00						0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

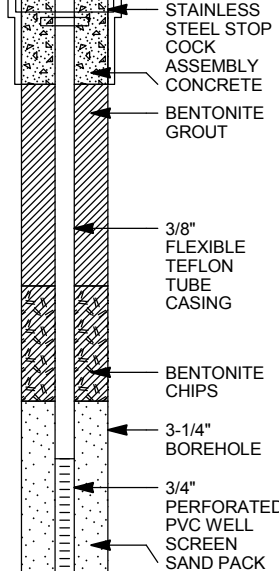


STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: GP5-12
DATE COMPLETED: August 30, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL							
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, firm, brown, moist - silty clay, trace sand, firm to stiff, mottled at 1.2ft BGS	0.30	 <p>STAINLESS STEEL STOP COCK ASSEMBLY CONCRETE BENTONITE GROUT 3/8" FLEXIBLE TEFLON TUBE CASING BENTONITE CHIPS 3-1/4" BOREHOLE 3/4" PERFORATED PVC WELL SCREEN SAND PACK</p> <p><u>WELL DETAILS</u> Screened interval: 4.00 to 5.00ft BGS Length: 1ft Diameter: 0.8in Slot Size: 0.010 Material: PERFORATED PVC Seal: 2.50 to 3.50ft BGS Material: BENTONITE CHIPS Sand Pack: 3.50 to 5.00ft BGS Material: SAND</p>	1GP				0.0
2	ASPHALT	2.00						
	SP-SAND (FILL), with gravel, fine to medium sand, fine to coarse gravel, poorly graded, compact, brown, moist - with bottom ash and slag, black at 2.75ft BGS - with coal at 3.5ft BGS	2.40				90		0.0
4	CONCRETE	3.90						
	CL-SILTY CLAY (FILL), trace fine to medium sand, low plasticity, stiff, brown, moist	5.00						0.0
6								
	- 1" sand seam, with bottom ash, black, staining, slight oil-like odor at 7.5ft BGS							
8	SP-SAND (FILL), with bottom ash, trace gravel, fine to medium sand, fine to coarse gravel, poorly graded, compact, dark brown, wet	8.00						3.7
	CL-SILTY CLAY, trace fine to medium sand, low plasticity, firm, brown, moist - soft to firm at 9.5ft BGS	9.00						
10	END OF BOREHOLE @ 10.0ft BGS	10.00						0.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: GP6-12

PROJECT NUMBER: 048041

DATE COMPLETED: August 30, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	CL-SANDY CLAY (FILL), trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist - with silt at 0.5ft BGS							
	CONCRETE	1.25						2.1
2	SP-SAND (FILL), trace gravel and glass debris, fine sand, fine to coarse gravel, poorly graded, compact, black, moist, staining, petroleum-like odor	1.80		1GP		85		202.7
4	- with bottom ash at 3.8ft BGS							
6	- wet, free product at 5.0ft BGS							150.2
8								239.1
10	END OF BOREHOLE @ 10.0ft BGS	10.00		2GP		70		302.7

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE

HOLE DESIGNATION: GP7-12

PROJECT NUMBER: 048041

DATE COMPLETED: August 30, 2012

CLIENT: PRP GROUP

DRILLING METHOD: GEOPROBE

LOCATION: DEARBORN, MICHIGAN

FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL							
	CL-SANDY CLAY (FILL), with silt, trace gravel, fine to medium sand, fine to coarse gravel, low plasticity, stiff, brown, moist, slightly mottled	0.35		1GP	90			0.0
2								
	SP-SAND (FILL), with gravel, slag and bottom ash, trace concrete, brick and glass debris, fine sand, fine to coarse gravel, poorly graded, compact, brown, moist - increase in debris, trace paper debris at 2.8ft BGS	2.25						0.0
4								
	SM-SILTY SAND, fine grained, compact, brown, moist - gray, slight oil-like odor at 5.0ft BGS	4.25						0.0
6			<p><u>WELL DETAILS</u> Screened interval: 4.00 to 5.00ft BGS Length: 1ft Diameter: 0.8in Slot Size: 0.010 Material: PERFORATED PVC Seal: 2.50 to 3.50ft BGS Material: BENTONITE CHIPS Sand Pack: 3.50 to 5.00ft BGS Material: SAND</p>	2GP	50			1.2
	- with clay, wet at 6.0ft BGS							
8								
10								1.0
	END OF BOREHOLE @ 10.0ft BGS	10.00						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: DEARBORN REFINERY SITE
PROJECT NUMBER: 048041
CLIENT: PRP GROUP
LOCATION: DEARBORN, MICHIGAN

HOLE DESIGNATION: GP8-12
DATE COMPLETED: August 30, 2012
DRILLING METHOD: GEOPROBE
FIELD PERSONNEL: C. BONDY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.25	<p>WELL DETAILS Screened interval: 3.00 to 4.00ft BGS Length: 1ft Diameter: 0.8in Slot Size: 0.010 Material: PERFORATED PVC Seal: 1.50 to 2.50ft BGS Material: BENTONITE CHIPS Sand Pack: 2.50 to 4.00ft BGS Material: SAND</p>	1GP	90			0.0
	SP-SAND (FILL), with silt, fine grained, compact, brown, moist	1.60						0.0
2	- with clay, trace coal, no silt, dark brown to black at 1.2ft BGS							
	SM-SILTY SAND (FILL), fine grained, compact, brown, moist	3.50						0.0
4	CL-SILTY CLAY (FILL), trace fine sand, low plasticity, stiff, brown, moist, mottled	5.00						0.0
	- firm at 4.5ft BGS							
6	ML-SILT, with clay, low plasticity, firm, brown, wet, slightly mottled	9.25		0.0				
				2GP	75			
8								
	CL-SILTY CLAY, trace fine sand, low plasticity, stiff, gray, moist	10.00	0.0					
10	END OF BOREHOLE @ 10.0ft BGS							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 48041-WIN.GPJ CRA_CORP.GDT 10/9/12

Appendix C

OMM Field Forms

COVER SYSTEM INSPECTION LOG

PROJECT NAME: Former Dearborn Refining Site - 3901 Wyoming Avenue, Dearborn, Michigan

LOCATION: Dearborn, Michigan

PROPERTY OWNER: City of Dearborn

PROJECT NUMBER: 48041

DATE:

(MM	DD	YY)		

INSPECTOR(S): _____

	<i>Item</i>	<i>Inspect For</i>	<i>Action Required</i>	<i>Comments</i>
1	Cover System ⁽¹⁾			
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>	Surface Conditions	- exposed geotextile fabric	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- erosion and/or sloughing	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- ponding of water	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- established vegetative ground cover	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- subsidence or settlement	_____	_____
2.	Stormwater Retention Area and Associated Swale, Grass-lined Ditch, and Berms ⁽¹⁾			
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>	Stormwater	- sediment accumulation (≤6 inches in Retention Area)	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>	Management	- debris construction	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- visible signs of erosion	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- established vegetation	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- signs of seepage through berms	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- accumulation of trash	_____	_____
3.	Other Site Systems ⁽¹⁾			
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>	Site Fencing	- integrity of fence	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- integrity of gates	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- integrity of locks	_____	_____
<div style="border: 1px solid black; width: 30px; height: 20px;"></div>		- placement and condition of signs	_____	_____

Notes:

√

 = OK

×

 = Issues Present

(1) Inspections will be completed monthly during operation of the Multi-Phase Extraction (MPE) System and quarterly thereafter for up to 10 years.

TREATED WATER CONVEYANCE PIPE (UNDER GRAVEL DRIVEWAY) INSPECTION LOG

PROJECT NAME:

Former Dearborn Refining Site - 3901 Wyoming Avenue, Dearborn, Michigan

LOCATION:

Dearborn, Michigan

PROPERTY OWNER:

City of Dearborn

PROJECT NUMBER:

48041

DATE:

(MM DD YY)

INSPECTOR(S):

	Item	Inspect For	Action Required	Comments
1	Pipe ⁽¹⁾			
<div></div>	Condition/	- integrity		
	Functionality	- sediment accumulation		
		- other blockage		

Notes:

√

= OK

×

= Issues Present

(1) Inspections will be completed monthly during operation of the Multi-Phase Extraction (MPE) System and quarterly thereafter for up to 10 years.

WELL INSPECTION SUMMARY⁽¹⁾

PROJECT NAME: Former Dearborn Refining Site - 3901 Wyoming Avenue, Dearborn, Michigan

PROPERTY OWNER: City of Dearborn

INSPECTION CREW MEMBERS: _____

SUPERVISOR: _____

DATE OF INSPECTION:

--	--	--	--	--	--

 To

(MM DD YY)

<i>Well I.D. Number</i>	<i>Lock</i>	<i>Surface Seal</i>	<i>Protective Casing</i>	<i>Riser</i>	<i>Sediment</i>	<i>Water Level (ft. BTOC)</i>	<i>Well Depth (ft. BTOC)</i>	<i>Other Comments</i>
MW1-08								
MW2-08								
MW3R-08								
MW4-08								
MW5-08								
MW7-10								
MW8-10								

Additional Comments: _____

Notes: _____

(1) Inspections will be completed monthly during operation of the Multi-Phase Extraction (MPE) System and quarterly thereafter for up to 10 years.

WELL INSPECTION SUMMARY⁽¹⁾

PROJECT NAME: Former Dearborn Refining Site - 3901 Wyoming Avenue, Dearborn, Michigan

PROPERTY OWNER: City of Dearborn

INSPECTION CREW MEMBERS: _____

SUPERVISOR: _____

DATE OF INSPECTION:

--	--	--	--	--	--

 To

(MM DD YY)

<i>Well I.D. Number</i>	<i>Lock</i>	<i>Surface Seal</i>	<i>Protective Casing</i>	<i>Riser</i>	<i>Sediment</i>	<i>Water Level (ft. BTOC)</i>	<i>Well Depth (ft. BTOC)</i>	<i>Other Comments</i>
MW9-10								
MW10-10								
MW13-11								
MW14-11								
MW15-11								

Additional Comments: _____

Notes: _____

(1) Inspections will be completed monthly during operation of the Multi-Phase Extraction (MPE) System and quarterly thereafter for up to 10 years.

MONITORING WELL RECORD FOR LOW-FLOW PURGING

Project Data:

Project Name: _____
Ref. No.: _____

Date: _____
 Personnel: _____

Monitoring Well Data:

Well No.:

Vapour PID (ppm):

Measurement Point:

Constructed Well Depth (m/ft):

Measured Well Depth (m/ft): _____

Depth of Sediment (m/ft): _____

Saturated Screen Length (m/ft):

Depth to Pump Intake (m/ft)⁽¹⁾: _____

Well Diameter, D (cm/in):

Well Screen Volume, V_s (L):

Initial Depth to Water (m/ft): _____

[illegible][illegible]

Notes:

- (1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.
- (2) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.
- (3) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged = V_p/V_s .
- (4) For conductivity, the average value of three readings $<1 \text{ mS/cm} \pm 0.005 \text{ mS/cm}$ or where conductivity $>1 \text{ mS/cm} \pm 0.01 \text{ mS/cm}$.

GAS PROBE INSPECTION AND MONITORING SUMMARY⁽¹⁾

PROJECT NAME: Former Dearborn Refining Site - 3901 Wyoming Avenue, Dearborn, Michigan

PROPERTY OWNER: City of Dearborn

INSPECTION CREW MEMBERS: _____

SUPERVISOR: _____

DATE OF INSPECTION:

--	--	--	--	--	--

 To

(MM DD YY)

<i>Gas Probe I.D. Number</i>	<i>Lock</i>	<i>Surface Seal</i>	<i>Protective Casing</i>	<i>Pressure Reading</i>	<i>Time of Reading</i>	<i>Measurement Method</i>	<i>Other Comments</i>
GP-01							
GP-02							
GP-03							
GP-04							
GP-05							
GP-06							
GP-07							
GP-08							

Additional Comments: _____

Notes:

(1) Inspections will be completed quarterly during and subsequent to operation of the Multi-Phase Extraction (MPE) System for up to 10 years.



about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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